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TABLES OF SPECTRAL LINES OF NEUTRAL AND IONIZED ATOMS

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Translated from Russian

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The original Russian text was published by Atomizdat in Moscow in 1966 and has been corrected and updated by the authors for this edition. In order to make this volume as useful and convenient as possible, last-minute additions and corrections have been incorporated into the tables in their proper locations at the expense of such typographic niceties as page length and spacing. This procedure also accounts for the lettered—occasionally only partly filled—pages interpolated at various points.

А. Р. СТРИГАНОВ, Н. С. СВЕНТИЦКИЙ

ТАБЛИЦЫ СПЕКТРАЛЬНЫХ ЛИНИЙ НЕЙТРАЛЬНЫХ И ИОНИЗОВАННЫХ АТОМОВ

TABLITSY SPEKTRAL'NYKH LINII NEITRAL'NYKH I IONIZOVANNYKH ATOMOV

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FOREWORD

Tables of Spectral Lines of Neutral and Ionized Atoms was first published in Moscow in 1966. All misprints and errors that have come to our attention have been corrected, and additions based on journal articles have been made for the Plenum Press edition. In particular, additions have been made in the tables for Li [4], C I [1], N I [1], N IV [12], and N V [14].

Such highly important spectra as those of N IV, N V, O IV, O V, and O VI in the visible and partially in the ultraviolet regions have, until recently, received almost no attention in the laboratory. The tables of these spectra include astrophysical data from B. Edlen (Z. Astrophys., 7:378, 1933) and C. E. Moore (A Multiplet Table of Astrophysical Interest, Part I, N.B.S., 1945) with rather rough estimates of the wavelengths of the spectral lines. But as the spectra of highly ionized atoms have been studied in the laboratory, these values have been determined more precisely, and we have striven to incorporate them in the American edition of the book. For the spectra of N IV and N V, we have employed the recent, comprehensive papers of R. Hallin (Arkiv for Fysik, 32:201, 1966; 31:511, 1966), in which the system of energy levels was refined and expanded, and many classified lines in the visible, ordinary ultraviolet, and vacuum ultraviolet regions are cited. In addition, our tables retain certain lines in the spectra of N IV, N V, O IV, and O V from the above-mentioned papers of Edlen and Moore, for which we calculated wavelengths according to the energy levels of Hallin. These lines are easily detected, since there are no intensity estimates in the second column of the tables.

We shall be very happy if the data in this book on the spectra of 22 elements are of use to physicists and engineers.

A. R. Striganov

Commission on Spectroscopy of the Academy of Sciences of the USSR, Moscow

April 10, 1968

PREFACE

Optical atomic spectroscopy finds ever-widening application in various fields of physics and technology. Spectroscopic methods have acquired great importance for the determination of the most important parameters of plasma in discharge tubes, in plasma apparatus, and in ion sources. The development of quantum generators is closely linked with the utilization of the results of optical spectroscopy, and it is therefore very important for investigators to have detailed data on the spectra of atoms and their ions. However, to date no books have been published, either here or abroad, containing sufficiently complete tabulations of the spectra of neutral and ionized atoms in all regions of the optical spectrum, and it has therefore been necessary to refer to individual journal articles, which has made work on the interpretation of spectra difficult.

Harrison's tables of spectral lines, although fairly complete, only cover the spectra of neutral and singly ionized atoms. The tables of A. N. Zaidel, V. K. Prokof'ev, S. M. Raiskii, and E. Ya. Shreider are mainly designed for spectral analysis, and only isolated very intense lines are given in the spectra of higher degrees of ionization. In Charlotte Moore's tables of multiplets the classification of the most intense lines of almost all the elements for many degrees of ionization is given, but these tables are not complete enough, and their arrangement according to multiplets makes work on the analysis of spectra difficult. Very complete tables on the far-UV region of the spectrum have recently been published by Kelly, but the classification of the lines is not given.

This book contains the emission spectra of 22 of the elements with which we most frequently have to deal in the investigations of plasmas in all their forms and modifications. For each spectral line the wavelength, intensity, and classification are given. The book contains the spectra of all the gaseous elements except radon, of all the alkali metals except rubidium, which is rarely met in nature, and the radioactive francium, and of carbon, magnesium, aluminum, silicon, calcium, titanium, iron, and copper, which sometimes are present in plasma as impurities. The choice of elements is to some extent arbitrary, and it might have been possible to include a few more if space had permitted.

For each element, in addition to the spectrum of the neutral atom, the spectra of several of its ions are given. In all, the tables contain over 30,000 lines in the IR, visible, near-UV and far-UV regions of the spectrum. In the compilation of the tables there is no demarcation of the region of the optical spectrum at either end.

These tables surpass all previously published tables in completeness for most of the elements (the exceptions are the spectra of Ca I and II, Ti I and II, and Fe I and II), and in particular the spectra of the gases have been greatly extended. Moreover, we give all necessary characteristics of the lines — their classification. In the examination of original papers we have come across many inaccuracies and errors in the classification of lines, and all the errors detected have been corrected.

In compilation of the tables for certain elements assistance was given by A. I. Odintsov, G. A. Odintsova, Z. I. Shlepkova, P. P. Gavrin, Yu. P. Dontsov, V. V. Eliseev, L. N. Kaporskii, and V. P. Kachalov. The general editing and checking of all the tables were done by Prof. A. R. Striganov.

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TABLES OF SPECTRAL LINES OF NEUTRAL AND IONIZED ATOMS

INTRODUCTION

The book consists of four main sections, in which spectral lines are assembled in the order of diminishing wavelength. In the first section the most intense lines are given for each element, and these are arranged according to the degrees of ionization of the atoms. The first column contains the wavelength in angstroms, the second the intensity of the line, and the third the energy of the upper level in electron-volts. The second section gives a summary table of the most intense lines arranged according to wavelength. Here the first column contains the wavelength in angstroms, the second the element to which it belongs and its degree of ionization, and the third the intensity of the line. The tables of the most intense lines in the first and second sections of the book are intended to facilitate rapid orientation to the spectrum under investigation and the detection of the main components and impurities in the plasma.

The third section gives complete tables of the spectral lines and their classification. As in the first section, the lines of elements are arranged in order of increasing atomic number, and in the table for each particular element, in order of increasing degree of ionization. In these tables the first column lists the wavelength in angstroms according to the most reliable literature sources, the second the intensity according to the same source, and the third and fourth the energies of the lower and upper levels in electron-volts. The relation $1 \text{ eV} = 8066.1 \text{ cm}^{-1}$ was used for conversion from cm⁻¹ to eV. The fifth column lists the transition expressed by the usual spectroscopic symbols for the lower and upper levels. The sixth column gives the corresponding internal quantum numbers of the total angular momentum of the electron. The tables of this section contain not only classified lines, but also lines which have been shown to belong to the given degree of ionization of the atom but whose has not yet been established. For some elements there are fairly intense lines which cannot yet be definitely assigned to the neutral atom or one or another ion. Such lines are collected in supplementary tables of unidentified lines.

The accuracies with which wavelengths have been measured by different authors are different. Lines are found in the tables for which the wavelength stated has a possible error of more than 1 Å. For some elements lines are given whose wavelengths were measured accurately to the fourth decimal place by the interferometric method. Such lines can be used as secondary standards for the accurate measurement of wavelengths of lines in the spectra under

investigation. All wavelengths of more than $2000 \, \mathring{A}$ were measured in air; shorter wavelengths are the values in a vacuum.

Intensities of lines are taken directly from the original papers, so that in the spectra of different atoms, and also in different regions of the spectrum of a given atom, different intensity scales are met. In most of the spectra the 10-grade intensity scale is used with some extension beyond 10 for very bright lines and with the use of the symbols 0 and 00 for very weak lines. This scale is used in almost all the spectra in the far-UV region, and also in the spectra of highly ionized atoms. For neutral and singly ionized atoms a 1000-grade scale is used most frequently with some extension for bright lines. In a number of spectra the 100-grade scale is used. Only in a few cases, when different authors used different scales for the estimation of the intensities of the lines which they measured, the intensities of a small part of the lines have been adjusted to a common scale. This was done in the spectra of Ne I, Ar I, Kr I, and Xe I, as a result of which the intensities of lines in the IR, visible, and near-UV regions are all expressed on the 1000-grade scale. In the IR and visible regions of the spectrum of He I [2] we used a 10,000-grade scale. For convenience of comparison with lines in the UV region these intensities are halved. In the spectrum of F I [1] a scale is used which reaches 500,000 units for the very brightest lines. In this case, in all regions of the spectrum except the far-UV the intensities of the lines are diminished tenfold.

From this it will be seen that the comparison of the intensities of lines in different regions of the spectrum, and especially of spectra of different degrees of ionization and of different elements, must be approached with great caution. This is not entirely because some authors use different scales and often estimate intensities visually without allowing for the spectral sensitivity of the photographic plate. It is necessary to remember also that the relative intensities of lines depend greatly on the source in which the spectrum is excited and on its parameters. Lines of different degrees of ionization are particularly sensitive in this respect. It was not possible to describe the source and conditions of excitement for each of the spectra presented in this book. It may be stated, however, that for metals and carbon the spectra of neutral atoms were excited with the aid of an electric arc or a discharge tube with a hollow cathode, while the spectra of ionized atoms were obtained with a condensed spark. In the case of gases the spectra of neutral and singly ionized atoms were excited in a Geissler tube. The spectra of higher degrees of ionization were obtained with the aid of a powerful spark in a vacuum. More detailed information on this question will be found in the literature, which is given in the book for each element.

The classification of the lines is derived from the original papers and also from Moore's tables [5, 6]. All old notations of levels have been replaced by modern ones in accordance with Moore's book "Atomic Energy Levels," since the publication of which many new levels have been established and the classification of a number of spectra has been greatly extended (C I, C II, N II, O I, F I, Na I, Mg I, Mg II, AC I, Si I, Si II, Si III, Si N, Cl I, Ar II, K I, Ca III). All this has been taken into account in the present book.

In the spectral tables in Section III for H, He, Li, C, N, O, Ne, Na, Ar, K, Kr, Xe, and Cs all classified spectral lines are included, but weak unclassified

TABLE 1

Element	Degree of ionization						Uniden- tified	Total		
Element _	I	II	Ш	IV	V	VI	VII	VIII	lines	1001
Hydrogen	150	-	_	_	_	_	-	_	_	150
Helium	153	62	-	-	_	_	-	-	_	215
Lithium	41	45	12	_	_	_	_	_	_	98
Carbon	482	500	327	81	13	3	_	-	_	1406
Nitrogen	576	565	304	112	74	4	_	_	_	1635
Oxygen	263	527	453	326	172	44	9	_	_	1799
Neon	1002	329	115	133	67	33	19	13	99	1810
Sodium	89	123	216	72	102	134	-	-	12	748
Argon	1012	1751	284	105	36	39	25	25	_	3277
Potassium	107	171	99	85	142	119	_	_	50	773
Krypton	645	1005	510	61	2	8	2	2	-	2235
Xenon	589	953	421	46	1	3	5	4	23	2045
Cesium	127	372	17	_	-	-			476	992

lines with intensities of I=1, 0, or 00 on the 10-grade scale for which the transitions are unknown and for which it is unknown whether the spectrum belongs to the neutral atom or an ion are excluded. In the case of the spectrum of Ar II [11, 12], in view of its very large size classified lines with intensities I of 0.5 and 0 are also excluded. In the spectra of high degrees of ionization there is no abridgment. In Table 1 we give the numbers of lines in Section III for each of the elements listed and in some cases the number of unidentified lines which have not yet been assigned to the neutral atom or an ion. The table also gives the total number of lines for each element.

TABLE 2

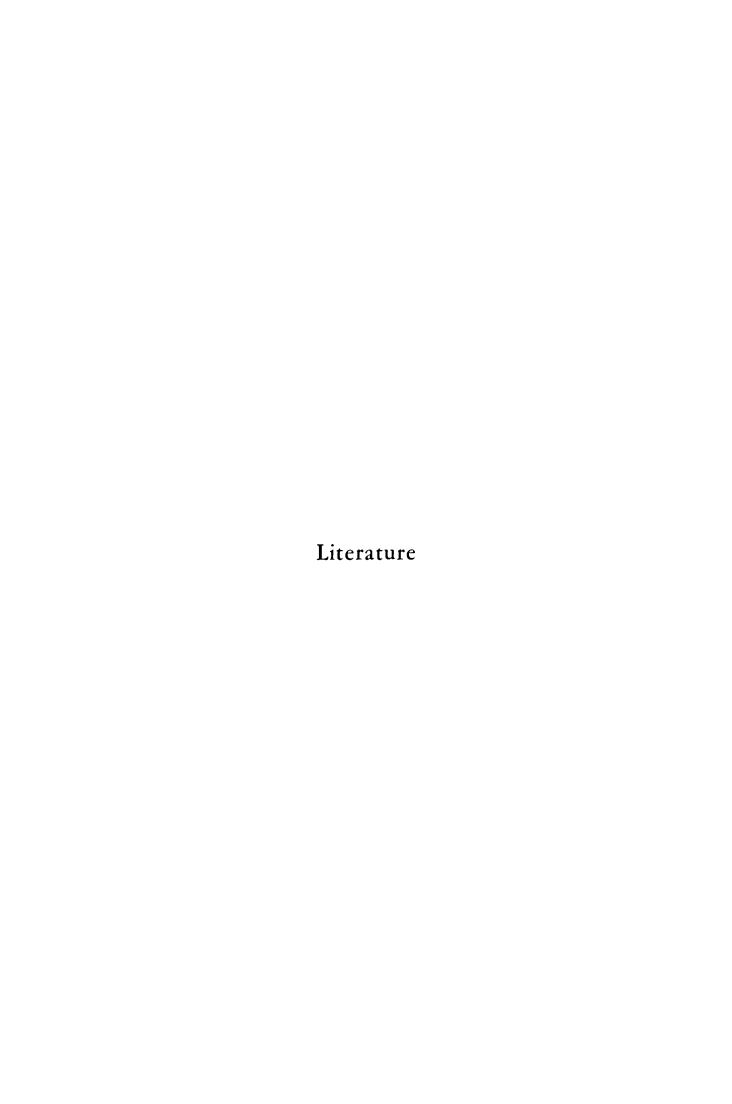
Element •	Degree of ionization						Uniden- tified	Total
Element -	I	II	III	IV	V	VI	lines	1041
Fluorine	438	255	281	208	113	61	_	1356
Magnesium	210	145	87	79	114	124	12	771
Aluminum	136	451	70	66	69	85	13	790
Silicon	438	311	323	118	13	63	_	1206
Chlorine	602	581	296	84	45	35	_	1643
Calcium	222	85	206	63	121	113	13	823
Titanium	1006	396	90	31	4	12	_	1539
Iron	115 9	844	427	73	145	101	_	2749
Copper	619	972	291	-	-	-	151	2033

From the spectra of neutral and singly ionized atoms of F, Mg, Al, Si, Cl, Ca, Ti, and Cu weak classified lines with I=1 or 0 on the 10-grade scale and unclassified lines with I=2, 1, or 0 are excluded. From the spectrum of Ti I classified lines with I=2 and unclassified lines with I=4 or 3 are also excluded. From the spectra of Fe I, II, and III all lines with I=4, 3, 2, 1, or 0 are excluded. Information on the numbers of lines given for these elements in this book is given in Table 2.

The fourth section of the book consists of a summary table of all lines arranged according to wavelength. For each line it is stated whether it belongs to the neutral atom or an ion, and its intensity is given.

The fifth section lists forbidden lines belonging to quadrupole and magnetic dipole transitions. Many of these lines are observed under ordinary conditions, and some are found in the spectra of the sun and the stars. In the same section the edges of the bands of the more important molecules are given, and there is a table of the wavelengths of lines in the molecular spectrum of hydrogen H_2 .

Below, for each element we list the literature used in the compilation of the data of the tables.



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- 14. R. Ricard, M. Givord, F. George, Compt. rend. Acad. sci. colon. 205:1229 (1937); cl. of Cs II, region 3750-1180 Å.
- 15. M. A. Fitzgerald and R. A. Sawyer, Phys. Rev. 46:576 (1934); cl. of Cs III.
- 16. W.W. Shaver, Trans. Roy. Soc. Canada 18:23 (1924); lines of Cs in far-UV region.
- 17. W. Finkelnburg and W. Humbach, Naturwissenschaften 42:35 (1955); ionization potential of Cs III.

Forbidden Lines

- 1. I.S. Bowen, Astrophys. J. 121:306 (1955); classification of lines of N, O, F, Ne, S, Cl, Ar, K, Ca, Mn, Fe.
- 2. C. E. Moore, A Multiplet Table of Astrophysical Interest, Parts I, II, N. B. S., Washington, 1945, cl. of lines of Be, C, N, O, F, Ne, Na, Mg, AI, Si, P, S, CI, Ar, K, Ca, Se, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Kr, Sr, Y, Zr, Xe, La, Eu.

Section I

Most Intense Lines for Each Element Arranged According to Degree of Ionization

λ, Å	I	$E_{_{ m B}}$, eV	λ, λ	I	E _B , eV
		HYDROG	EN, Z = 1		
	Io	nization pot	tential 13,597 eV		
$\begin{array}{c} 40511 \ ,4 \\ 18751 \ ,1 \\ 12818 \ ,05 \\ H_{\alpha} \ 6562 \ ,793 \\ H_{\beta} \ 4861 \ ,332 \\ H_{\gamma} \ 4340 \ ,468 \end{array}$	120 700 140 3000 500 200	13,06 12,75 13,06 12,09 12,75 13,06	H ₀ 4101,737 1215,670 1025,722 972,537 949,743	100 3000 1000 400 200	13 ,22 10 ,20 12 ,09 12 ,75 13 ,06
	_		UM, Z = 1		
		nization pot	ential 13,601 eV		
$\begin{array}{c} 18746 \ ,0 \\ 12814 \ ,56 \\ D_{\alpha} \ \ 6561 \ ,032 \\ D_{\beta} \ \ 4860 \ ,029 \\ D_{\gamma} \ \ \ 4339 \ ,287 \end{array}$	700 140 3000 500 200	12,75 13,06 12,09 12,75 13,06	D _δ 4100,621 1215,340 1025,443 972,272 949,485	100 3000 1000 400 200	13 ,22 10 ,20 12 ,09 12 ,75 13 ,06
		TRITIU	M, Z = 1		
	Io	nization pot	ential 13,603 eV		
$18744,3$ $12813,40$ T_{α} 6560,435 T_{β} 4859,595 T_{γ} 4338,893	700 140 3000 500 200	12,75 13,06 12,09 12,75 13,06	T_{δ} 4100 ,249 1215 ,229 1025 ,350 972 ,184 945 ,401	100 3000 1000 400 200	13,22 10,20 12,09 12,75 13,06
		HELIU	M,Z=2		
He I, ionizati	ion potential	24,586 eV	584 ,334	500	21,22
20581.,30 18696 ,94 18685 ,96	10000 1500 3600	21 ,22 23 ,74 23 ,74	537 ,030 522 ,213 He II, ionizati	200 80 on potentia	23,09 23,74 a1 54,414 eV
17002,38	1800	23,73	6560,099	100	52,90
10830 ,337 10830 ,248 10829 ,088 7065 ,190 6678 ,151	25000 15000 5000 2500 1000	20,96 20,96 20,96 22,72 23,07	5411,524 4685,682 3203,104 2733,32 2511,22	50 300 200 100 50	53 ,30 51 ,01 52 ,24 52 ,90 53 ,30
5875 ,966	1000	23,07	1640,474	10	48 ,37
5875 ,621 4471 ,479 3888 ,648	7500 1000 5000	23 ,07 23 ,73 23 ,01	1640 ,332 1215 ,171 303 ,783	5 5 500	48 ,37 51 ,01 40 ,81
3187 ,745 2945 ,106	$\begin{array}{c} 200 \\ 100 \end{array}$	23 ,71 24 ,03	256 ,317 243 ,027	150 70	48,37 51,01
		LITHIU	M, Z = 3		
Li I, ionizat	ion potentia	1 5,391 eV	Li II, ionizatio	on potentia	1 75,635 eV
26877,82 24464,66 18703,09 17546,05 6707,84	8 6 7 7 1000	3,83 4,34 4,54 4,54 1,85	5484 ,7 5037 ,8 4788 ,8 4677 ,7 3249 ,8	10 6 8 8 5	61 ,28 72 ,10 72 ,23 72 ,23 73 ,46
6103,64 4602,86 3232,66 2741,20	500 100 50 10	3,88 4,54 3,83 4,52	3199 ,43 2767 ,0 2730 ,7 1756 ,0	7 4 5 5	73 ,46 74 ,12 74 ,12 69 ,28
= 1 =		, - '	· F		91

		<u>``</u>			
λ, Å	1	$E_{_{f B}}$, eV	λ, Å	I	E _B , eV
1682 ,4	4	69,59	Li III. ionizatio	n notential	. 192 446 ₀V
				n potentia	
1653,9	8 6	68,78	729,1		108,84
1493 ,7	7	69,58	135,02	_	91,94
1198,6	•	69 ,37	113,93	_	108,84
			N, Z = 6		
CI, ionization	n potential		1037,017	13	11,96
14542,5 0	179	8,54	1036,330	12	11,96
14420,12	61	9.71	1010,369	10	17,61
11754,76	144	9,70	1010,074	10	17,61
11753,32	142	9,70	904 ,468	10	13,71
11748,22	82	9,69	904,134	12	13,72
9 405,7 3	1 6	9,00	903,950	11	13,71
9094 ,83	12	8 ,85	903,609	10	13,72
8335 ,15	13	9,17	687,355	11	18,05
7115,19	9	10,38	687,059	1 0	18,04
7113 ,18	9	10,38	CIII. ionization	n potential	47,881 eV
6014,85	9	10,70	8500,32	10	32,10
6013,22	10	10,70	8332,99	7	41,33
6006,03	9	10,71	5695,92	12	34,28
5380 ,34 5052 ,17	10 8	9 ,99 10 ,14	4651,47	11	32 ,19
			4650,25	13	32 ,19
4932,05	8	10,20	4647,42	14	32,19
4771 ,75 2967 ,244	8 5	10,08	4325,560	8	41,30
2582 ,901	5	4 ,18 7 ,48	4186,900	9	42,97
2478,556	16	7,68	4070 ,261	9	42,96
			4068,912	9	42,96
1930,905 1657,008	10 10	7 ,68 7 ,4 9	4067 ,940	8	42,96
1561,435	$\overset{10}{20}$	7,95	2982,106	8	38,43
1560,691	1 5	7,95	2725,90	7 7	44,46
1277,551	10	9,71	2725 ,30 2724 ,85	6	44 ,46 44 ,46
1277,282	9	9,71	1		· ·
1193,252	10	10,40	2697,75	7	43,99
			2296,870	16 9	18,09
			$\begin{array}{c} 2162,944 \\ 977,026 \end{array}$	1 8	40 ,01 12 ,69
			574,279	12	34,28
C II,ionizati	on potentia	I 24,381 eV	538,312	13	29,53
7236,42	20	18,05	538,150	13 12	29,53 29,53
7231 ,32	18	18,04	538,075	11	$\frac{29}{53}$
6582,88	15	16,33	535,288	10	41,25
6578,05	18	16,33	511,527	10	42,32
5891,59	12	20,15	459,633	15	33,47
5889,77	15	20,15	459,521	14	33,47
5151 ,09	1 3	20,71	459,462	13	33,47
5145 ,16	15	23,12	386,203	14	32,10
5143,49	12	23,11	li .		
5133,28	12	23,12	CIV, ionizatio	n potentia	I 64,489 eV
5132,94	12	23,11	5811,98	.9	39,68
4267,258	20	20,95	5801,33	10	39,68
4267,003	18	20,95	4658,30	9	58,44
3920,693	18 15	19,49	2906,29	5 6	60,05
3918 ,978	15	19,49	2530,6		55,78
2992,618	18 48	22,19	2529,98	11	55 ,78
2837 ,603 2836 740	18 20	16,33 16,33	2524 ,41 2405 ,10	$\frac{9}{6}$	55 ,78 55 78
2836 ,710 1335 ,684	14	$\begin{array}{c} 16,33 \\ 9,29 \end{array}$	2403,10	5	55 ,78 55 ,78
1334,515	13	9,29	1550,771	19	7,99
		~ ,=0			. ,00

λ, Å	I	$E_{_{ m B}},\ { m eV}$	λ, λ	I	E _B , eV
1548,185 419,714 419,525 384,178 384,032	20 14 13 17 16	8,01 37,55 37,55 40,28 40,28	248,668 40,731 40,270 34,973 33,426	<u>0</u> 	354 ,24 304 ,38 307 ,87 354 ,49 370 ,90
312,455	14	39,68	CVI, ionization	potential 4	•
312 ,418 289 ,143 244 ,907 C V, ionizatio	15 9 10	39,68 50,87 50,62	33 ,734 28 ,464 26 ,988	 	367 ,44 435 ,51 459 ,33
248,744	0	354,24	20,000		,
		NITROG	EN, Z = 7		
N I, ionizatio	on potential	14,548 eV	1096 ,322	35	13,69
13581,33	1200	11,60	1095,940	35 30	13 ,70 13 ,94
13429,61 12469,62	670 1350	11,60 13,00	1069 ,984 1068 ,476	35	13,99
12461,25 10114,644	$680 \\ 13$	12,99 12,99	1067,607 965,042	35 10	14,00 12,85
10112,483	12	12,99	953,658	15	13,00
10108,893 10105,130	11 10	13,00 12,86	953 ,415 906 ,426	15 15	13,00 13,68
8711 ,708 8683 ,400	15 16	11 ,75 11 ,76	906,202 N II. ionizati	10	13,68
8680,270	17	11,76	10065,15	7	27,44
8629 ,238 8594 ,005	16 15	12,12 12,12	10035 ,45 10023 ,27	7 8	27 ,45 27 ,45
8216,317 7915,419	$\begin{array}{c} 15 \\ 7 \end{array}$	11,84 13,92	9969 ,34 9891 ,09		27,44 27,42
7898,985	8	13,92	6610,565	13	23,47
7468,309 7442.299	$\begin{array}{c} 16 \\ 15 \end{array}$	11,99 11,99	6482,053 5941,653	13 12	$20,41 \\ 23,24$
7423,639 6723,12	$\begin{array}{c} 14 \\ 9 \end{array}$	11,99 13,69	5931 ,779 5710 ,766	11 10	23,24 20,64
6 484 , 88	9	13,67	5686,213	10	20,64
6482 ,74 6008 ,48	9 10	13 ,68 13 ,66	5679,562 5676,019	14 11	20 ,66 20 ,64
5564,37 5560,37	9 9	13,99 14,00	5666,627	12	20,66
4935,03	1 0	13,20	5010,620 5007,325	10 11	20 ,94 23 ,41
4151 ,46 4109,959	12 12	13,32 13,70	5005,149	14	23 ,14
4099,951 3830,39	$\frac{9}{9}$	13,70 13,92	5001 ,477 5001 ,136	12 11	23 ,13 23 ,12
3822 ,07 1494 ,668	6 60	13,92 10,68	4994,363	10	23,42
1492,817	30	10,69	4643,085 4630,543	11 14	21 ,15 21 ,15
1492 ,624 1411 ,939	80 30	10 ,69 12 ,36	4621,394 4607,157	10 1 0	21 ,15 21 ,15
1319,684	30	12,97	4601,480	11	21 ,16
711, 1200 1199, 549	30 50	10 ,33 10 ,34	4447 ,033 4041 ,311	12 11	$23,19 \\ 26,21$
1101,293 1100,362	40 30	13,64 13,65	3994,998	15	21,60 21,60
100,302	40	13,67	3955 ,851 3918 ,999	10 9	23,57
1098,103 1097,245	4 0 5 0	13,68 13,69	3838 ,374 3437 ,147	8 9	2 4 ,39 22 ,10
1097,245	35	13,69	3328,730	$\ddot{7}$	24,39

λ, Å	I	E _B , eV	λ, Å	I	$E_{_{ m B}},~{ m eV}$
3006,830 2522,227 2520,791 2317,046 2316,690 2316,493 1844,4	7 7 6 8 6 7 10	24,53 26,07 26,06 26,01 25,99 26,00 25,19	686,335 685,816 685,513 684,996 452,226 451,869 374,441 374,204	14 16 15 14 11 10 12	18,08 18,10 18,08 18,10 27,44 27,44 33,13 33,13
1085 ,701 1085 ,542	12 9	11 ,43 11 ,44	N IV, ionizatio	on potentia	
1084,572 1083,990 916,700 916,004 915,955 915,603 775,957 746,976 671,391 660,280 645,167 644,825 644,621	11 10 12 11 10 10 12 7 8 9 10 9	11,44 11,44 13,54 13,54 13,54 13,54 17,88 18,50 18,47 20,67 19,23 19;23	6380,77 3484,96 3482,99 3478,71 2646,956 2645,654 1718,551 955,335 924,283 923,675 923,220 923,057 922,519	8 13 14 15 12 11 10 20 20 14 14 16 14 14 14	50,15 50,33 50,33 50,34 68,73 68,73 23,42 29,18 21,76 21,75 21,76 21,76
N III, ionization 4641,90	i potentiaj	33,13	921,992 765,148	15	21,78 16.20
4640 ,64 4634 ,16 4514 ,89 4379 ,09	10 8 7 10	33 ,13 33 ,13 38 ,40 42 ,54	335,050 283,579 283,470 283,420	11 12 11 10	53,20 52,07 52,07 52,07
4103,37 4097,31 3771,08 3754,62 3374,06 3367,36 2983,58 2862,26 2063,99 2063,50 991,579 991,514	9 10 7 6 6 7 6 6 10 10 17	30,46 30,46 38,96 38,96 39,34 39,35 42,49 44,04 48,13 48,12 12,52 12,52	N V, ionizatio 4944,56 4619,98 4603,73 2981,31 2980,78 1242,804 1238,821 266,378 266,197 247,709 247,564	9 10 12 10 8 19 20 9 8 7 6	97,881 eV 90,94 59,23 59,24 88,44 88,44 9,97 10,00 56,55 56,55 60,06 60,05
989 ,790 772 ,385	16 12	1 2 , 52	N VI, ionizati	on notentia	1 552 04 AV
771,901 771,544 764,357 763,340	11 10 15 14	23,16 23,16 23,16 16,24 16,24	29,084 28,787 24,898 23,771	— — — — — —	426 ,27 430 ,67 497 ,94 521 ,55
		OXYGE	$\mathbf{ZN}, \mathbf{Z} = 8$		
OI, ionization		•	7771,943 7254,529	28 17	10 ,74 12 ,70
13165 ,11 13164 ,85 13163 ,89 8446 ,758 8446 ,359	24 26 25 29 30	11,93 11,93 11,93 10,99 10,99	7254,447 7254,154 7002,228 7001,915	20 19 17 15	12,70 12,70 12,76 12,76
8446 ,250 7775 ,388 7774 ,166	27 26 27	10 ,99 10 ,74 10 ,74	6455 ,975 6454 ,445 6453 ,602	19 18 17	12,66 12,66 12,66

λ, Å	I	E _B , eV	λ, Å	I	$E_{\mathrm{B}}, \ \mathrm{eV}$
6158 ,183	21	12,75	718,562	16	20,58
6158,183	21	12,75	718,484	17	20,58
6156 ,765	20	12 ,75	672 ,948 644 ,148	${f 8} \\ {f 12}$	23,44 $28,12$
6155,975	19	12,75	•		22,98
3954 ,387 3947 ,489	10 7	14,12 12,28	539 ,547 539 ,086	8 8	23,00
3947,301	10	12,28	538 ,256	10	26,36
3823 ,469	10	15 ,78	537 ,830	9	28,38
3692 ,440 1306 ,025	$\begin{array}{c} 7 \\ 25 \end{array}$	12,88 9,52	O III, ionizati	_	
1304,866	30	9,52 9,52	5592,37 5268,06	$rac{6}{2}$	36 ,07 41 ,26
1302,173	30	9,52	3961,59	8	41 ,14
1040 ,941	15	11,93	3759,87	9 7	36 ,48 36 ,45
1039 ,233 1027 ,433	20 20	11 ,93 12 ,09	3754 ,67		40 .27
988,776	$\frac{15}{15}$	12,54	3265 ,46 3260 ,98	10 8	40,27
O II, ionizati	on potentia	l 35,146 eV	3047,13	8	37,25
4705,355	8	28,88	2983 ,78 2686 ,14	9 1 0	38,01 46,62
4676 ,234 4661 ,635	8 9	$25,65 \\ 25,64$	2874,57	8	54,01
4649,139	10	25,66	2665,69	7	54,01
4641 ,811	9	25,65	2597,69	8	45 ,62
4596 ,174	8	28,36	2390 ,44 2382 ,32	8 7	41 ,26 45 ,47
4590 ,971 4416 ,972	9 8	28 ,36 26 ,22	835,292	16	14,88
4414,909	10	26,25	835,096	14	14,88
4349,426	8	25 ,85	833,742	16 14	14 ,88 14 ,88
4319 ,631	8	25,85	832 ,927 703 ,850	18	17,65
4317, 139 4189, 788	8 1 0	25 ,84 31 ,32	702,899	17	17,65
4185,456	8	31,32	702,822	16	17,65
4119,221	8	28,86	599,598 597,818	18 15	23 ,1 9 26 , 09
4075,868	10	28,71	525,795	18	26,09
4072 ,164 3973 ,263	8 10	28 ,69 26 ,55	508,182	18	24,43
3911,960	10	28 ,83	507,683	17	24,43
3749 ,49	9	26,30	434,975 374,075	10 10	33,86 33,18
3727,33	8 7	26,30 26,30	345,309	10	41,26
3712,75 3470,81	8	29,25	328 ,448	10	40,26
3407,38	7	32,15	320,979	12 10	41 ,14 40 ,58
3390 ,25	8	28,94	305 ,769 305 ,656	9	40,58
3377,20 3138,44	7 8	28 ,95 29 ,60	303.799	9	40,87
3134,82	10	29,62	O IV, ioniza	tion potenti	al 77,394 eV
2575,300	10 8	29 ,06 29 ,06	5305,3	15 10	62 ,18
2571 ,476	8	29,06	4799 ,2 4798 ,25	10 5	61,94
2530 ,30 2445 ,55	10	28,51	4786,4	20	<u> </u>
2433, 538	9	28 ,91	4783 ,43	4	61,94
2300 ,35 2293 ,32	$\frac{8}{6}$	28 ,83 28 ,82	3071,66	$\frac{5}{6}$	48 ,37 48 ,38
	10		3063 ,46 2836 ,25	6	58,79
932,046 919,78	15	_	2517,40	7	59 ,35 59 ,36
834,462	15	26,30	2509,23	8	59 ,33
833 ,326 832 ,754	15 14	26 ,30 26 ,30	2507,77	7 8	
796,661	10	20,58	2501 ,80 2499 ,29	$\overset{\circ}{6}$	59,33
7 90,001	10	1	·		2

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
2469 360	λ, Å	I	E _B , eV	λ, Å	I	E _B , eV
2469 360	2400		* 0.00	- 200 //5	4.0	00.51
2450,06						
2449, 36 2449, 36 38 3	2493 ,40	7	59,35	760,229		26,51
2440 36	2450_06	10	_			
787 710 13 13 15 7.4 220 352 13 75 385 787 710 15 15 7.4 220 352 13 75 385 779 9.05 10 31 .63 207 .794 10 86 .12 207 .996 13 74 .50 0 13 .74 .50 0 12 .74 .50 0 13 .74 .50 0 13 .74 .50 0 13 .74 .50 0 13 .74 .50 0 12 .74 .50 0 13 .74 .50 0 13 .74 .50 0 12 .75 .50 0 12 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 13 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0 14 .75 .50 0						
787,710			15.74			
779,905	787,710			220,352	13	75,95
625,852				207.794	10	86.12
192,052,052			·			
192, 160						
192,751 12 74 50						
172,163				192,751		
Second						72 ,01
\$\begin{array}{c ccccccccccccccccccccccccccccccccccc				1		
554, 074 17 22, 38 3811, 35 2 82, 60 553, 328 16 22, 41 1037, 613 9 11, 95 279, 937 11 44, 34 1031, 912 10 12, 04 290, 389 10 63, 35 183, 937 8 79, 35 228, 573 15 52, 01 173, 082 13 83, 64 OV, ionization potential 113,873 eV 150, 124 9 82, 58 6830 8 87, 79 129, 786 5 107, 47 2789, 86 3 72, 28 129, 786 5 107, 47 2781, 04 5 72, 29 128, 500 0 665, 14 1371, 287 10 28, 73 120, 331 00 664, 07 762, 001 10 26, 49 21, 804 — 568, 59 2781, 04 5 72, 29 128, 500 0 665, 14 1371, 287 10 28, 73 120, 331 00 664, 07				h '		ŕ
553,328			22,41			
279,937			22,38			
279,633						
260, 389	219,951	11	44,54			
238, 573	633, 279	10	44,34	104,117	9	79,55
238,573	260,389	10	63,35	183,937		79 ,35
O V, ionization potential 113,873 eV 150,124 9 82,58 6830 8 87,34 150,088 40 82,60 4158,8 0 87,79 129,786 5 107,47 2789,86 3 72,28 128,500 0 665,14 2781,04 5 72,29 128,412 00 665,14 1371,287 10 28,73 120,331 00 664,07 762,001 10 26,51 21,804 — 568,59 761,130 10 26,49 21,602 — 573,91 FLUORINE, Z = 9	238,573	15	52,01	173,082	1 3	83,64
6830 8 8 7,34 4158,8 0 87,79 4123,9 2 84,04 2789,86 3 72,28 2787,03 4 72,28 2781,04 5 72,29 2781,04 10 28,73 762,001 10 26,51 2761,130 10 26,49 21,602 — 573,91 FLUORINE, Z = 9 FI. ionization potential 17.422 eV 8900,92 1000 15,90 8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 954,825 1000 12,98 8230,773 3000 15,88 954,825 1000 12,98 8231,726 2500 15,88 951,871 500 13,02 8274,665 18000 14,53 7800,212 15000 14,61 7754,666 18000 14,53 7800,212 15000 14,61 7754,666 18000 14,58 7398,688 10000 14,68 7398,688 10000 14,68 7398,688 10000 14,68 7398,688 10000 14,68 7398,688	238 ,361	14	52 ,01	172,935	1 2	
6830	OV ionizatio	n notential	443 873 aV	150,124		82,58
4158,8			•	150,088	10	82,60
133,9				129,872	6	107,48
2789,86 3 72,28 2787,03 4 72,28 2781,04 5 72,29 2781,04 5 72,29 2782,001 10 28,73 762,001 10 26,51 21,804 — 568,59 761,130 10 26,49 2781,04 5 72,29 28,412 00 665,14 213,804 — 568,59 761,130 10 26,49 21,602 — 573,91 FLUORINE, Z = 9 FI. ionization potential 17.422 eV 8298,581 2000 15,88 8298,581 2000 15,88 8298,581 2000 15,88 8274,615 1500 15,88 8214,726 2500 15,88 8214,726 2500 15,88 8214,726 2500 15,88 830,931 1000 14,53 8800,912 15000 14,68 7398,688 10000 14,37 7398,688 10000 14,37 7398,688 10000 14,68 7311,019 15000 14,68 7320,360 15000 14,75 7127,890 30000 100 1		0		129,786		
2787,03	9780 86	2 2		il .	n notontia	1 730 114 V
2781,04		4	72,20	1		•
1371 ,287	•			128,500		
T62,001 10 26,51 21,804 — 568,59 FLUORINE, Z = 9 FI. ionization potential 17.422 eV 973,895 350 12,73 8900,92 1000 15,90 958,524 500 12,98 8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8244,726 2500 15,88 951,871 500 13,02 8040,931 1000 14,53 806,964 150 15,36 8040,912 15000 14,61 15 806,964 150 15,36 7811,019 15000 14,61 15 15,36 FII. ionization potential 34,985 eV 7202,360 15000 14,75 4247,18 12 31,56 7127,890 30000 14,76 4246,16 15 31,58 70						
FLUORINE, Z = 9 F1. ionization potential 17.422 eV 8900, 92 1000 15, 90 8298, 581 2000 15, 88 8230, 773 3000 15, 88 8230, 773 3000 15, 88 8244, 726 2500 15, 88 8040, 931 1000 14, 53 7854, 696 18000 14, 58 7398, 688 10000 14, 58 7398, 688 10000 14, 58 7398, 688 10000 14, 75 7422, 360 15000 14, 68 7037, 469 45000 14, 75 6902, 475 15000 14, 55 6856, 030 50000 14, 55 6856, 030 50000 14, 56 6834, 264 9000 14, 58 6834, 264 9000 14, 58 6834, 264 9000 14, 68 6348, 508 10000 14, 68 6348, 508 10000 14, 68 6348, 508 10000 14, 55 6836, 300 50000 14, 55 6836, 300 50000 14, 55 6836, 300 50000 14, 56 6348, 508 10000 14, 58 6348, 508 10000 14, 68 6348, 508 10000 14, 68 6348, 508 10000 14, 68 6348, 508 10000 14, 68 6348, 508 10000 14, 68 6368, 508 10000 14, 68 6377, 745 100 12, 73 6870, 217 100 12, 75 6870, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217 100 12, 75 6876, 217					00	
FLUORINE, Z = 9 F1. ionization potential 17.422 eV 8900,92 1000 15,88 958,524 500 12,98 8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8214,726 2500 15,88 809,599 125 15,36 8040,931 1000 14,53 806,964 150 15,36 8040,931 1000 14,61 7754,696 18000 14,61 7754,696 18000 14,58 7398,688 10000 14,461 7754,996 30000 14,68 4446,71 10 31,56 7202,360 15000 14,68 4446,71 10 31,56 7202,360 15000 14,75 4226,11 10 31,56 7202,360 15000 14,75 4226,16 15 31,58 7037,469 45000 14,76 4246,16 15 31,58 7037,469 45000 14,75 4246,16 15 31,58 7037,469 45000 14,75 4246,16 15 31,58 7037,469 45000 14,75 4246,16 15 31,58 7037,469 45000 14,75 4246,16 15 31,58 7037,469 45000 14,75 4226,10 10 29,55 6870,215 8000 14,53 4103,085 10 28,77 6870,215 8000 14,53 4025,495 15 25,75 6856,030 50000 14,54 4025,010 10 25,75 6834,264 9000 14,54 4024,727 20 25,75 6834,264 9000 14,53 3851,667 10 25,75 6834,264 9000 14,53 3851,667 10 25,75 6834,264 9000 14,53 3847,086 20 25,12 6413,651 8000 14,68 3849,987 15 25,12 6413,651 8000 14,68 3849,987 15 25,12 6438,508 10000 14,68 3847,086 20 25,12 6438,508 10000 14,68 38505,614 15 28,66 977,745 100 12,73 3503,095 12 28,66 977,745 100 12,75 3501,416 10 28,66					_	
F1. ionization potential 17.422 eV 973,895 350 12,73 8900,92 1000 15,90 958,524 500 12,98 8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8214,726 2500 15,88 951,871 500 13,02 8240,931 1000 14,53 806,964 150 15,36 8040,931 1000 14,58 806,964 150 15,36 7398,688 10000 14,58 FII. ionization potential 34,985 eV 7398,688 10000 14,68 4446,71 10 31,56 7311,019 15000 14,75 4299,177 10 29,55 7127,890 30000 14,75 4246,16 15 31,58 7037,469 45000 14,53 4103,085 10	761,130	10	26 ,49	□ 21 ,602	_	573 ,91
8900, 92 1000 15,90 958,524 500 12,98 8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8214,726 2500 15,88 809,599 125 15,36 8040,931 1000 14,53 806,964 150 15,36 7800,212 15000 14,61 FII. ionization potential 34,985 eV 7398,688 10000 14,37 4447,18 12 31,56 7311,019 15000 14,68 4446,71 10 29,55 7127,890 30000 14,75 4299,177 10 29,55 7127,990 30000 14,76 4103,525 15 28,77 6870,215 8000 14,53 4103,085 10 28,77 6876,215 8000 14,55 4025,010 10			FLUOR	•		
8298 581 2000 15 ,88 955 ,545 750 13 ,02 8274 ,615 1500 15 ,88 954 ,825 1000 12 ,98 8230 ,773 3000 15 ,88 951 ,871 500 13 ,02 8214 ,726 2500 15 ,88 809 ,599 125 15 ,36 8040 ,931 1000 14 ,53 806 ,964 150 15 ,36 7800 ,212 15000 14 ,61 7754 ,696 18000 14 ,58 806 ,964 150 15 ,36 7398 ,688 10000 14 ,58 4447 ,18 12 31 ,56 7311 ,019 15000 14 ,68 4446 ,71 10 31 ,56 7202 ,360 15000 14 ,75 4299 ,177 10 29 ,55 7127 ,890 30000 14 ,76 4246 ,16 15 31 ,58 7037 ,469 45000 14 ,53 4103 ,085 10 28 ,77 6870 ,215 8000 14 ,53 4025 ,495 15 25 ,75 6884 ,264 <	FI, ionization	n potential	17.422 eV	973,895		12,73
8298,581 2000 15,88 955,545 750 13,02 8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8214,726 2500 15,88 809,599 125 15,36 8040,931 1000 14,53 806,964 150 15,36 7800,212 15000 14,61 7754,696 18000 14,58 806,964 150 15,36 7311,019 15000 14,58 4447,18 12 31,56 4291,177 10 29,55 429,55 4299,177 10 29,55 429,55 429,177 10 29,55 429,77 40 29,55 429,77 10 29,55 429,77 40 29,55 429,77 40 29,55 4103,525 15 28,77 4103,525 15 28,77 4103,525 15 28,77 4103,525 15 28,77 4103,651 4025,495 15 <td>8900,92</td> <td>1000</td> <td>15,90</td> <td>958,524</td> <td>500</td> <td>12 ,98</td>	8900,92	1000	15,90	958,524	500	12 ,98
8274,615 1500 15,88 954,825 1000 12,98 8230,773 3000 15,88 951,871 500 13,02 8214,726 2500 15,88 809,599 125 15,36 8040,931 1000 14,53 806,964 150 15,36 7800,212 15000 14,61 7754,696 18000 14,58 10000 14,58 12 31,56 7311,019 15000 14,68 4447,18 12 31,56 31,56 7202,360 15000 14,75 4299,177 10 29,55 31,58 7127,890 30000 14,76 4246,16 15 31,58 31,58 7037,469 45000 14,53 4103,085 10 28,77 6902,475 15000 14,53 4103,085 10 28,77 6856,030 50000 14,53 4025,495 15 25,75 6834,264 9000 14,54 4024,727 20 25,75 <td>8298 ,581</td> <td></td> <td>15,88</td> <td>055 545</td> <td>750</td> <td>43.09</td>	8298 ,581		15,88	055 545	750	43.09
8230 ,773 3000 15 ,88 951 ,871 500 13 ,02 8214 ,726 2500 15 ,88 809 ,599 125 15 ,36 8040 ,931 1000 14 ,53 806 ,964 150 15 ,36 7800 ,212 15000 14 ,61 FII. ionization potential 34.985 eV 7398 ,688 10000 14 ,37 4447 ,18 12 31 ,56 7311 ,019 15000 14 ,68 4249 ,177 10 29 ,55 7127 ,890 30000 14 ,75 4246 ,16 15 31 ,58 7037 ,469 45000 14 ,75 4103 ,525 15 28 ,77 6800 ,475 15000 14 ,53 4103 ,085 10 28 ,77 6870 ,215 8000 14 ,55 4025 ,495 15 25 ,75 6834 ,264 9000 14 ,53 3851 ,667 10 25 ,75 6773 ,984 7000 14 ,68 3849 ,987 15 25 ,12 6239 ,651 13000 14 ,68 3847 ,0	615, 8274		15 ,88			
8214,726 2500 15,88 809,599 125 15,36 8040,931 1000 14,53 806,964 150 15,36 7800,212 15000 14,61 FII. ionization potential 34,985 eV 7398,688 10000 14,37 4447,18 12 31,56 7311,019 15000 14,68 4446,71 10 31,56 7202,360 15000 14,75 4299,177 10 29,55 7127,890 30000 14,76 4246,16 15 31,58 7037,469 45000 14,75 4103,525 15 28,77 6902,475 15000 14,53 4103,085 10 28,77 6870,215 8000 14,55 4025,495 15 25,75 6856,030 50000 14,50 4025,010 10 25,75 6873,984 7000 14,53 3851,667 10 25,12 6413,651 8000 14,68 3849,987 15 25,12 <td>8230 ,773</td> <td></td> <td>15,88</td> <td></td> <td></td> <td></td>	8230 ,773		15,88			
8040,931 1000 14,53 806,964 150 15,36 7800,212 15000 14,61 FII. ionization potential 34,985 eV 7754,696 18000 14,58 FII. ionization potential 34,985 eV 7398,688 10000 14,37 4447,18 12 31,56 7311,019 15000 14,68 4446,71 10 31,56 7202,360 15000 14,75 4299,177 10 29,55 7127,890 30000 14,75 4246,16 15 31,58 7037,469 45000 14,75 4103,525 15 28,77 6870,215 8000 14,53 4103,085 10 28,77 6870,215 8000 14,53 4025,495 15 25,75 6856,030 50000 14,50 4025,010 10 25,75 6874,264 9000 14,53 3851,667 10 25,12 6413,651 8000 14,68 3849,987 15 25,12						
7800 ,212 15000 14 ,61 FII. ionization potential 34.985 eV 7754 ,696 18000 14 ,58 4447 ,18 12 31 ,56 7311 ,019 15000 14 ,68 4446 ,71 10 31 ,56 7202 ,360 15000 14 ,75 4299 ,177 10 29 ,55 7127 ,890 30000 14 ,75 4246 ,16 15 31 ,58 7037 ,469 45000 14 ,75 4103 ,525 15 28 ,77 6902 ,475 15000 14 ,53 4103 ,085 10 28 ,77 6856 ,030 50000 14 ,55 4025 ,495 15 25 ,75 6854 ,264 900 14 ,54 4024 ,727 20 25 ,75 6773 ,984 700 14 ,53 3851 ,667 10 25 ,12 6413 ,651 8000 14 ,68 3849 ,987 15 25 ,12 6239 ,651 13000 14 ,68 3505 ,614 15 28 ,66 977 ,745 100 12 ,73 3503 ,095<	8040 934	1000				
7754,696 18000 14,58 7398,688 10000 14,37 4447,18 12 31,56 7311,019 15000 14,68 4446,71 10 31,56 7202,360 15000 14,75 4299,177 10 29,55 7127,890 30000 14,76 4246,16 15 31,58 7037,469 45000 14,75 4103,525 15 28,77 6902,475 15000 14,53 4103,085 10 28,77 6856,030 50000 14,55 4025,495 15 25,75 6834,264 9000 14,54 4024,727 20 25,75 6773,984 7000 14,53 3851,667 10 25,12 6413,651 8000 14,68 3849,987 15 25,12 6239,651 13000 14,68 3505,614 15 28,66 977,745 100 12,73 3503,095 12 28,66 976,217 100						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				FII, ionizatio	on potentia	1 34,985 eV
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				4447 48	19	24 56
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
7037,469 45000 14,75 4103,525 15 28,77 6902,475 15000 14,53 4103,085 10 28,77 6870,215 8000 14,55 4025,495 15 25,75 6856,030 50000 14,50 4025,010 10 25,75 6834,264 9000 14,54 4024,727 20 25,75 6773,984 7000 14,53 3851,667 10 25,12 6413,651 8000 14,68 3849,987 15 25,12 6239,651 13000 14,68 3847,086 20 25,12 6239,651 13000 14,68 3505,614 15 28,66 977,745 100 12,73 3503,095 12 28,66 976,217 100 12,75 3501,416 10 28,66						
6902,475						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				1100,020	10	20,11
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				4103,085		28,77
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		8000	14,55	4025 ,495	15	25,75
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6856,030	50000	14.50	4025,010	10	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$						25 , 75
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				3851 ,667	10	25,12
6348,508 10000 14,68 3849,987 15 25,12 6239,651 13000 14,68 3505,614 15 28,66 977,745 100 12,73 3503,095 12 28,66 976,217 100 12,75 3501,416 10 28,66	6413,651	8000		9940 007	4 ~	
6239,651 13000 14,68 3505,614 15 28,66 977,745 100 12,73 3503,095 12 28,66 976,217 100 12,75 3501,416 10 28,66		10000		3049,987		
977,745 100 12,73 3503,095 12 28,66 976,217 100 12,75 3501,416 10 28,66						
976,217 100 12,75 3501,416 10 28,66						40,00 20,66
, , , , , , , , , , , , , , , , , , , ,						
	26	100	-2,.0	. 0001,410	10	20,00

	1				
λ, Å	I	E_{B} , eV	λ, Å	I	$E_{\mathbf{B}}$, eV
2264 46	7	99 04	2200 20	ς.	57 44
3264 ,16 3202 ,740	7 10	33,01 30,53	2298,29 $2171,44$	5 4	57 ,11 58 ,23
3153,492	6	32,10	679,217	16	18,33
3059,960	8	29,17	679,003	13	18,33
3058 ,141	7	29 ,17	677 ,224	15	18 ,33
3057,083	6	29,17	677, 154	13	18,34
608,065	7	20,46	676 ,130	14	18,34
607,472	6	20 ,47	572,637	16.	21,73
606,805	8	20,46	571,384	15	21,73
606 ,284	6	20,49	571,302 570,636	14 14	21 ,73 21 ,73
605,668	7	20,47	H		
546 ,846 544 045	$rac{6}{6}$	22,67	490 ,997 490 ,566	16 13	28 ,38 31 ,91
514 ,945 484 ,600	8	26,66 $28,17$	430,300	15	31,91
471,990	$\ddot{6}$	$\frac{26}{26}, \frac{17}{27}$	420,727	16	29,54
457 ,177	6	29 ,71	420,041	15	29,54
FIII, ionizati	on notantial	62 650 eV	419 ,644	14	29,54
		02.000	FV, ionization p	otential 1	14,237 eV
3264 ,164 3174 ,725	9 10	44,13	2707 ,17	2	81,68
3174,125	$\overline{12}$	44 ,18	2450,63	$egin{array}{c} 2 \\ 2 \\ 5 \end{array}$	70,11
3121 ,515	12	43,30	2252,72	2 5	82,60 26,64
3115 , 669	10	43 ,27	466,995 465,978	$\frac{3}{7}$	26,70
3042 ,808	10	46,72			
2916,335	10	43,58	465,374	6	26,64
2860,308	9	49,02	464,370 190,839	5 7	26 ,70 65 ,06
2811 ,422 2788 ,093	$\begin{array}{c} 10 \\ 20 \end{array}$	44 ,69 44 ,67	190,835	6	65,06
			186,842	5	77,10
2759 ,589 2484 ,360	$\begin{array}{c} 10 \\ 9 \end{array}$	47,14 $44,32$		5	88,43
658,337	$1\overset{\circ}{2}$	18,83	178,434 166,177	10	74,70
656,878	11	18 ,87	165,983	$\ddot{9}$	74,69
656,125	10	18,90	163,558	5	86,54
567,737	9	26,06	148,002	5	83,86
676, 567	10	26,06	134 ,539	5	92,24
508,384	10	30,78	F VI, ionization	n potential	l 157,151 eV
465,113	10 9	33 ,05 33 ,09	2327,28	5	97,97
464 ,284			2323,35	7	97,98
430 ,154	11 10	33,05 33,09	2315,39	9	98 ,00
429 ,511			535,204	10	23,16
FIV, ionizat	ion potentia	1 87,157 eV	156 ,247	6	102 ,51
2826 ,13	5	56,10	139,900	7	100,70
2820,74	4	56 ,05	139,800	$\frac{6}{5}$	100,69 100,69
2456,92	5 4	61 ,15 61 ,10	139 ,758 126 ,923	<i>5</i>	97,67
2451,58	4	01,10	120,020	Ü	07,00
		NEO	N, Z = 10		
Ne I, ionizat	ion potentia	l 21,564 eV	9665 ,424	1000	19,66
23636,3	205	20,19	9534 ,167	500	20,02
18390,10	180	20 ,81	9486,680	500	19,69
18385 ,17	160	20,81	9425,38	$\begin{array}{c} 500 \\ 600 \end{array}$	20 ,02 20 ,04
18282,58	200	$20,71 \\ 20,71$	9326 ,52 9300 ,85	600	20,04
18276 ,59	260		1		,
11177,59	300	19,66	9201,76	600	20 ,04 20 ,05
11143.09	300	19,69 40.78	9148 ,68 8865 ,7562	600 500	20,05 $20,03$
10844,54 $40562,43$	$\begin{array}{c} 200 \\ 200 \end{array}$	19 ,78 20 ,14	8853,8669	700	20,04
10562,43	200	20,14	, 5555,6555		,

λ, Å	I	$E_{\rm B}$, eV	λ, λ	I	$E_{\mathbf{B}}$, eV
8783,7539	1000	20 ,14	615,623	5	20 ,14
8780 ,6223	1200	20,05	Ne II, ionizatio	n potentia	l 41.079 eV
8681,9216	500	20,04	4428,54	6	37,55
8679 ,4898 8654 ,3837	500 1 500	20 ,14 20 ,14	4409,30	7	37,65
8634,6472	600	20,14	4397 ,94	6	37,55
8495 ,3591	500	20,03	4391,94	7	37,62
8377,6062	800	20,03	4379,50	6	37,63
8300,3248	600	20,05	4290,40	6	37,62
7245,1665	1000	18,38	$egin{array}{cccc} 4219,\!76 \ 3777,\!16 \end{array}$	6 8	37 ,54 30 ,55
7173,9380	1000	18,57	3766,29	8	30,52
7032 ,4128	1000	18,38	3734 ,94	7	30 ,55
6929 ,4672 6598 ,9529	1000 1000	18 ,63 18 ,72	3727,08	9	31,18
6402,2460	2000	18,55	3713,084	10	31,12
6382,9914	1000	18,61	3709 ,64 3694 ,197	7	30,57
6334,4279	1000	18,57	3664,112	10 9	$30,52 \\ 30,55$
6266,4950	1000	18,69	3542,90	7	34,86
6217 ,2813 6163 ,5939	1000 1000	18,61 18,72	3355,05	7	30,93
6143,0623	1000	18,63	3334 ,87	10	30,88
6074,3377	1000	18,71	3323,75	7	31,51
6029,9971	1000	18,72	3297 ,74	7	30,93
5975, 5340	600	18,69	3218,21	8	34,74
5881 ,8950 5852 ,4878	1000	18,72	2955 ,73 1938 ,827	7 8	31 ,36 34 ,25
	2000	18,96	1930,033	8	34,28
5764 ,4188 5400 ,5616	$\begin{array}{c} 700 \\ 2000 \end{array}$	20 ,70 18 ,96	1916, 081	10	34,25
5343,2834	600	20,70	1907,494	8	34,28
5341,0938	1000	20,70	462,388	14	26,91
5330 ,7775	600	20,71	460 ,725 447 ,813	15 8	$26,91 \\ 27,78$
4957,0335	1000	21,11	446,252	8	27,78
4884 ,9170 4827 ,3444	1000 1000	21 ,11 21 ,95	407,136	8	30,55
4788,9270	1000	21,95	405,852	9	30,55
4715 ,3466	1500	21,18	Ne III. ionizati	ion notonti	·
4712,0660	1000	21,18	H		
4710,0669	1000	24,01	2678,64 2677,90	$\begin{array}{c} 25 \\ 30 \end{array}$	44,23 44,23
4708, 8619 4704, 3949	1200 1500	21 ,01 21 ,02	2613,41	12	48,53
4537,7545	1000	21,02	2610,03	15	48 ,53
3593,5263	500	20,30	2595,68	20	43,72
3520,4714	1000	20,37	2593,60	30	43,72
3472,5706	500	20,19	$\begin{array}{c} 2590,04 \\ 2412,94 \end{array}$	$\frac{40}{12}$	47,73 49,37
3417 ,9031 3369 ,9069	500 700	20,30	2412,73	15	49,37
•		20,30	2263 ,21	12	54,01
3369 ,8076 3057 ,388	500 300	20 ,30 20 ,90	2216,07	15	54,12
2982,663	300	$\frac{20}{20}, 77$	2213,76	12	54,13
2974,714	300	20,78	2163,77	15 20	49,46
2675 ,64	200	21,30	$\begin{array}{c c} 2095,54 \\ 2092,44 \end{array}$	$rac{20}{12}$	54 ,16 54 ,16
2675,24	200	21,30	2089,43	15	54,17
2647,42 $743,721$	$\begin{array}{c} 200 \\ 12 \end{array}$	21,30 16,67	491,050	9	25,33
735,892	30	16,87	490,310	7	25,40
629,729	6	19,69	489 ,501 488 ,868	10 7	25 ,33 25 ,44
626 ,819	6	19,78	488,103	8	25,44 $25,40$
618,668	5	20,04	379,308	7	35,89

λ, Å	I	EB, eV	λ, Å	I	$E_{_{{f B}}},{ m eV}$
Ne IV, ionizat	ion potentia	1 97,044 eV	416 ,198	80	33,54
2384 ,95 2373 ,21 2372 ,16	7 9 7	64,66 64,62	365 ,594 359 ,385 358 ,472	100 50 50	37 ,67 34 ,63 34 ,63
2357,96 2352,52	10 8	64 ,72 64 ,66	Ne VI, ionizati	ion potential	157,94 eV
2285 ,79 543 ,891 542 ,073 469 ,865 469 ,817	9 150 100 200 200	68 ,86 22 ,79 22 ,87 31 ,47 31 ,47	2253 ,22 2055 ,93 2042 ,382 562 ,805 403 ,262	3 3 3 15 10	109 ,20 95 ,62 95 ,66 22 ,19 30 ,91
421,609 388,218 387,141 358,721 212,556	150 100 125 200 150	37 ,11 39 ,64 39 ,73 39 ,64 63 ,44	401 ,939 401 ,138 122 ,686 122 ,520	25 15 10 20 Ne VII	31 ,01 30 ,91 101 ,22 101 ,22
208,734	100	59,40	1992 ,060	3	127,51
208,485 Ne V, ionizat	100 ion potentia	59 ,47 I 126,287 eV	1981 ,974 465 ,21 106 ,2	$\begin{smallmatrix}6\\10\\7\end{smallmatrix}$	127,54 26,65
2265 ,71 2263 ,39	$\frac{6}{3}$	79,55 79,40	106,2	$\dot{7}$	_
2259,57	3 3	79 ,45 92 ,05		Ne VIII	
2245 ,48 2232 ,41	3 4	92,05 92,15	780 ,324 770 ,409	4 8	,87 ,87 16 ,09
2227 ,42 572 ,336	3 80	92,09 21,80	98,2 98,1	9	_
569 ,830 482 ,987	30 50	21 ,81 25 ,81	88,1	9	_
		SODIU	M, Z = 11		
Na I, ionizat	tion potentia	1 5,139 eV	Na II, ioniza	tion potentia	1 47.30 eV
22056 ,44 14767 ,48 11403 ,78 11381 ,45 10834 ,87	300 1155 12 11 8	3,75 4,59 3,19 3,19 4,76	3631 ,266 3533 ,043 3285 ,603 3129 ,368 3092 ,729	8 10 8 6 10	36 ,35 36 ,35 37 ,09 36 ,90 36 ,85
10749 ,29 10746 ,44 9961 ,281 8649 ,922 8194 ,8237	9 10 7 7 9	4,34 4,34 4,86 4,62 3,62	3053,664 2984,183 2951,231 2904,914 2893,946	6 7 8 7 6	41,27 41,12 41,05 37,21 41,25
5895 ,9236 5889 ,9504 5688 ,2046 4545 ,186 4541 ,633	16 32 9 8 7	2,10 2,10 4,28 4,83 4,83	2881 ,140 2841 ,721 2671 ,829 2660 ,996 2611 ,815	6 7 6 7 7	37,24 37,21 40,99 41,01 41,10
4497,658 4494,177 4423,246 4393,340	11 10 7 9	4,86 4,86 4,91 4,93	2531 ,548 376 ,375 372 ,069	6 3 6	41 ,25 32 ,94 33 ,32
4390,029	8	4 ,93 4 .97	Na III. ioniza 2563,32	ition potentia 25	50,40
4324,615 3302,979	7 18	4,97 3,75	2553,61	25 50	50,36 50,36
3302,369 2853,013	19 15	3,75 4,34	2497,05 2474,69	40 30	50 ,40 50 ,47
2852 ,811	16	4,34	4 2468,86	ου	29

λ, Å	I	$E_{_{ m B}}$, eV	λ, Å	I	$E_{_{ m B}}.{ m eV}$
2459 ,40	45	51,36	181 ,758	8	68 ,21
2309,96	30	51,69	168,409	8	
2297 ,14	25	51,10			73,75
2296,64	25	51,87	168,084	10	73,76
2285,72	35	51 ,87	162,445	8	80,18
•	40		156 ,536	8	79 ,21
2278,48	40 45	51,89	Na V. ionizatio	on potential	138.627 eV
2251 ,44	40 40	51,10			-
2246,66		51 ,02	463,263	12	26,76
2239,43	45 40	51,10	461,051	10	26 ,89
2232 ,17	40	51 ,87	459,897	7	26,96
2230,30	50	50,95	445 ,190	7	36,84
2225,90	45	51,07	400,722	10	36,84
2202,78	4 0	51,02	360 ,367	8	43,39
2011,88	30	57,52	360,319	8	43,39
2005,24	30	57,65	333,910	$\overset{\circ}{9}$	46,12
1005 50	30	51,75	332,550	8	46,26
1985,58 4965,04	18		308,264	10	46,12
1965 ,04 1960 ,76	$\frac{18}{20}$	57 ,26 57 ,40	307,152	8	46,26
1950,70	4 0	51,75	001,102	· ·	10,50
1946,43	$\frac{40}{20}$	60,98	Na VI, ionizati	on potential	172.36 eV
,			491 ,340	6	25,32
1933 ,87	30	57 ,43	489,580	5	25 ,32 25 ,32
1926,27	45	57 ,46	417,595	$\overset{3}{6}$	29,92
1856 ,73	20	57,08	415,505	4	29,92
1850 ,39	18	57,10	366,110	4	59,17
1850 ,24	20	61,32			•
1849,58	35	57,06	362,444	4	43,41
1844,36	20	57,08	361,250	8	38,59
		· i	317,641	$\underline{6}$	43,41
Na IV. ionizat	ion potential	98.902 eV	313,748	5	39,75
412,240	8	30,21	311,921	4	39 ,75
411,333	7	30,34	127,837	4	101,36
410,540	6	30,34	124,153	4	100,10
371, 410	1 0	30,21	124,059	4	100,10
409,615	8	30 ,40	123 ,929	5	100,27
408,682	8	30,34	109,896	5	117,20
319,638	10	42,64	107,683	5	115,36
190,835	8	65,10	107,608	4	115,30
190,440	10	65,10	107,288	4	115,30
100,110	10	00,10	101,200	-	110,70
	1	MAGNESIU	UM, Z = 12		
Mg I, ionizat	ion potential	7.645 eV	10914,23	10	00, 01
		1	10092 ,16	14	12,86
15024,99	35 45	5,93	9632,435	11	12,86
11828,18 10811,085	45 35	5 ,39 7 .00	9631,888	12	12 ,86
5711,0880	30	7,09	0340 544	10	
5528,4047	40	6 ,52 6 ,59	9340 ,544 9327 ,545	10	14,18
		· · · · · · · · · · · · · · · · · · ·	9244,266	13	14 .18
5183,6042	45	5 ,11	9218,248	14	10,00
5172,6843	44	5 ,11	8835,082	11	10,00
5167,3216	42	5,11			13,49
4702,9909	30	6,98	8824,323	10	13 ,49
3838 ,293	4 0	5,95	8745,657	11	13,50
3832,302	38	5 ,95	8734,990	10	13,50
3829 ,355	36	5,95	8234,639	11	11,50
2852 ,127	50	4,35	7896,368	13	11 ,57
1827,97	8	6,78	7877,051	12	11,57
1747 ,81	$\ddot{5}$	7,09	6545,973	11	13 ,52
			6346,737	10	13 ,52
Mg II, ionizati	ion potential		4481 ,327	13	11,63
10951 ,78		10,00	4481 ,130	14	11,63
20					

	, ,				
λ, Å	1	E _n , eV	λ, λ	<i>1</i>	$E_{\rm B}$, eV
1000 501	44)	40.00	400. 500	()	ev of
4390 ,564	10	12,82	180,796	9	68,85
2936,509	10	8,65	180,617	10	68,64
2802,704	12	4,42	180,070	8	68,85
2797,998	16)	8,86	172,306	7	72,23
2 7 95 ,528	13	4,43		8	72,23
9000 047	()	· I	171,653	0	12,20
2660 ,817	8	13,52	Mg V, ionization	notentia	1 141 262 eV
2660 ,755	8	13,52		i potentia	
1753,474	66	11,50	355,326	1 2	35,12
1750 ,664	50	11,50	354 ,223	10	35 ,31
Mg III, ioniza	tion potentia	il 80,134 eV	353 ,300	.9	35,31
2092,64	4	58,85	353,694	14	35,12
	5		352,202	10	35,42
2065,54	., 5	58 ,77	351,089	12	35 ,31
1749,02		65,94	312,311	10	49,33
1738,91	6	65,90		16	49,33
234,258	12	52,92	276,581		90,22
231,730	14	53,50	137,414	8	50,22
187,194	8	65,83	Mg VI, ionizatio	n notenti	1 186 898 aV
	$\overset{\circ}{9}$		mg vi, ionizatio	n potenti.	11 100.0.00
186,510		66 ,47	403,315	8	30,74
170,802	3)	72,59	400,676	7	30,94
Mg IV, ionizat	tion potentia	1 109,318 eV	399,289	$\dot{6}$	31,05
	18	38,62	349,155	10	42,22
323,310				12	52,56
320,999	20	38,62	270,394		
181 ,345	8	68,64	268,986	10	52,80
Al I, ionizati	on potential		UM, $Z = 13$	9	16,54
21163,75	13	4,67	8354,35	10	16,54
21093,04	12	4 ,67	6201,70	9	17,31
16750,56	12	4 ,83	6201,52	10	17,31
16718,96	11	4,83	6183,42	1 ŏ	17,30
13150,76	14	4,09	6182,28	8	17,30
•	15	4,09	5593,23	10	15,41
13123,41			5316,07	7	17,92
11254,881	15	5,12	il		
11253,190	14	5,12	5283 ,77	8	17 ,93
8773 ,896	14	5,43	4666,8	11	18,26
8772,866	13	5,43	4663,054	10	13,20
7836,134	1 2	5,60	3900 (68	10	10,59
7835 ,309	11	5,60	3655,00	8	16,47
6698,673	11	4 ,99			
6696,023	13	4 ,99	3587 ,057	8	15,30
5557,063	10	5 ,37	3586 ,546	9	15,30
	26	3,14	2868,52	9	17,97
3961,5200	26 24	3,14	2816,179	20	11,82
3944,0058			2669,166	10	4,63
3092 ,8386	20	4,02	4009 94	15	11,32
3092,7099	26	4,02	1862,34	10	11,32
3082 ,1529	24	4,02	1858,05		18,10
2660,386	12	4,67	1828,61	10	11,66
2652,475	12	4,67	1764,01	10 15	11,85
2575,095	10	4 ,83	1725 ,01	15	
2567,983	10	4 ,83	1721 ,31	10	11 ,85
2372,070	10	8,84	1670,81	15	7,42
	10	8,83	1539,74	10	15 ,41
2369,304	4	7,02	1		
1769 ,140	4	7,02	Al III, ionizatio		ai 20,447 6V
1766,385	4	7,03	5722,65	6	17,80
1765,636			5696,47	8	17,81
Al II, ionizati	ion potential	18,8 27 eV	5163,90	7	25,94
8640,7	8	13,26	5150,86	6	25,94
8363,52	8	16,54	4701,65	6	23 ,41
0,00,004	S	1			برون

λ, Å	I	$E_{_{ m B}}$, eV	λ, Å	I	$E_{_{ m B}}.$ eV
/590 476	0	90 55	000 000	1.0	44.49
4529 ,176	6	20,55	278,699	16	44,48
3601,623	6	17,81	131,441	20	94,75
2907,05	10	25,04	131,003	20	95,06
2762 ,815	9	25,03	130,848	20	94,75
.83 , 83	10	20 ,7 8	130,413	20	95,06
1862,899	10	6,65	126,065	15	98,77
	10	6,65	125,525	15	98,77
1854,67				20	90,11
1611,90	8	14,37	107,945	20	_
1605,70	8 5	14,37	Al VI, ionizatio	n notential	190 466 aV
893,905		20,55	Til VI, IODIZUCIO	n potential	150,400 • 1
768, 856	5	21,15	243,760	12	56.02
695,817	5	17,81	109,514	20	113,21
560 ,390	7	22 ,15	107,620	14	120,35
·	•		104,344	$\overline{16}$	119,15
Al IV, ionizat			104,047	$\overset{20}{20}$	119,15
161,686	14	76,68	92,626	$\overline{15}$	133,85
160,073	16	77,45	90,858	12	141,61
130,403	11	95,10	90,200	$\frac{12}{20}$	
729, 129	12	95 ,57			142,60
124,034	8	99,55	88,376	15	140,61
116,459	7	106,46	88,273	15	145,61
•		·	88,170	20	140,61
Al V, ionizati	ion potentia		§ 87 , 655	13	141,44
281,397	14	44,48	85,515	15	144,98
		SILICON	N, Z = 14		
Si I. ionizat	ion potentia	1 8,151 eV	5466,868	500	14,79
10869,5408	130	6,22	5466,432	500	14,79
10827,091	140	7,33	5202,413	500	18,73
8556,7803	120	7,32	5055,981	1000	12,52
7944,0011	140	7,54	5041,026	1000	12,52
7932,3490	120	7,53	4130,893	500	12,84
			3856,017	500	10,04
7423 ,4969	425	7,29			•
7415,9462	275	7,29	3339 ,819	500	13,78
7405 ,774	375	7,29	2905,692	500	14 ,01
7289 ,1730	4 00	7,32	2904,283	300	14,10
2881,5792	1000	5,08	1816,921	200	6 ,86
2528,5086	450		1808,003	150	6,86
	$\frac{430}{425}$	4,93	1		
2524,1079		4,92	1533,445	1000	8,12
2519,2023	350	4,93	1526,719	500	8,12
2516,1125	500	4,95	1350,057	150	14,53
2514 ,3161	375	4,93	1309,274	200	9,50
8973, 2506	425	4 ,95	1265,023	200	9 ,84
1545, 2435	300	5 ,87	1264,730	2000	9,80
1901,331	1000	7,30	1260,418	1000	9,84
1874,838	500	7,39	1251,164	200	15,25
1850,668	500	6,73	1229,388	200	
			1194,496	250 250	15 ,43
1847 ,468	4 00	6 ,72	i		10 ,41
1845,510	300	6,72	1193,284	200	40,39
1814,068	500	7,62	992,675	200	12,52
Si II. ionizat	ion potentia	l 16.342 eV	891,999	200	13,93
9412,72	100	14 ,15	Si III, ionizat	ion potentia	al 33,466 eV
7849,72	500	14,10	8103,448	11	
7848,80	400	14,10	7612,356		30,08
6371,359	1000	10,07		12 20	28,22
6347,103	1000	10,07	5739,733	20 48	21,88
			4828,968	18	28,55
5978 ,929	500	12,15	4574,759	20	21,72
5957,561	500	12,15	4567,823	25	21,73
5669 .562	1000	16,38	4552 ,616	30	21,74

			· · · · · · · · · · · · · · · · · · ·		
λ, Å	I	$E_{_{ m B}},{ m eV}$	λ, Å	I	$E_{_{ m B}},~{ m eV}$
3924 ,468	20	28 ,55	Si IV, ionization	n potential	45 140 eV
3806,544	$\frac{20}{30}$	24,99			
3796,114	$\overset{30}{25}$	24,99	4654,323	10	39,09
·			4631,241	9	39,09
3791 ,41	20	24 ,99	4212,407	7	39,08
3 590 ,46 5	20	25 ,33	4116,097	9	27,06
3241,622	15	25,56	4088 ,854	10	27,08
3233,954	14	$25,\!56$	3762 ,435	8	34,29
3210,534	15	28 ,55	3165,710	9	31,00
3196,504	14	28,55	3149,561	7	31,00
3186,022	13	28,55	1673,374	150	-
3185,125	16	$\frac{25}{77}$	1402,770	12	8 ,34
3096,826	16	21,72	1393,755	15	8,90
3093,424	20	21,73	1291 ,969	30	<u>-</u>
•			1280 ,336	20	_
3086,236	25	21,74	1128,340	10	19,88
2655,512	14	30,06	1128,325	10	19 ,88
2559 ,210	14	25,39	1056,582	12	<u>.</u>
2 541 ,818	25	15 ,15	1051,596	70	_
1303,320	16	16,10	818,128	8	24,05
1301,146	14	16,08	815,053	7	24,05
1298,960	18	16,13	1	•	
1298,891	15	16,10	Si V, ionization		
1296,726	$\tilde{14}$	16,10	118,968	20	104,21
1294,543	17	16,13	117,860	20	105 ,19
1201,010			97,143	10	127,62
1206,533	30	20,55	96,439	15	128,56
1206,510	30	10,27	85,175	10	145 ,56
1113,228	18	17,72	Si VI, ionizatio	n notential	205 457 eV
1109,965	16	17,72	- II		
,368, 1108	14	17,72	99,460	15	124,65
007.000	4.0	40.04	84,082	12	148,07
997,389	16 13	19 ,01 19 ,01	83 ,128 80 ,577	$\begin{array}{c} \textbf{15} \\ \textbf{12} \end{array}$	149 ,14 153 ,86
994 ,787	10	·	INE, Z = 17	12	100,00
				450	10.10
Cl I, ionizati	on potential	13,017 ev	8375,95	150	10,40
20199,36	227	92, 10	8333,27	5000	10,47
19766,78	185	10,93	8212,00	100	10,43
19755,28	717	10,90	7878,22	$\begin{array}{c} 75 \\ 125 \end{array}$	10,49
19370,30	227	10,92	7744 ,94	120	10,63
16198,47	259	11,39	7717 ,57	100	10,59
•	283	11,28	7547 ,06	100	10,63
15970,49	735	11,25	7414,10	90	10,59
15959,97	342	11,23	7256,63	125	10,63
15928,92	277	11,35	4601,00	20	11 ,97
15883,34	2780	11,18	4526,20	30	11,94
15869 ,66			4438,48	$\overset{\circ}{20}$	11,71
15730,06	1487	11,22	4389,76	$\frac{20}{25}$	11,74
15520,29	1094	11,29	4379,90	$\frac{20}{20}$	11,82
15465,07	381	11,39	4363,30	$\frac{20}{20}$	11,83
15108,04	269	11,25	1		
14931,70	294	11,32	4323,35	20	11,85
13821,72	525	11,30	1379,529	11	8,98
13346,76	550	11,49	1363,449	10	9,20
13296,01	310	12,11	1351,657	10	9,28
13243,83	350	11,37	1347 ,238	12	9 ,20
11436,34	1000	11,36	1201,358	11	10,43
11409 ,68	269	11,37	1188,768	12	10,43
11122,97	300	11,39	Cl II, ionizat	ion potenti	al 23.80 eV
10392,51	331	10,47	[[100	18,03
8585,96	100	10,43	6094,65	100	15,03 15,95
8428 ,25	100	10,50	5443,42	100	10,50

λ, Å	I	E _B , eV	λ, À	ī	E _B , eV
5423 ,52 5423 ,25 5392 ,12	100 150 100	15,96 15,96 18,30	3530,03 3393,45 3392,89	9 8 8	26 ,87 27 ,01 27 ,02
5217,93 5103,04 5099,30 5078,25 4917,72	150 125 100 150 125	16,34 18,14 18,14 18,16 18,23	3340 ,42 3329 ,06 3191 ,45 3139 ,34 2710 ,37	9 8 9 8 7	25,29 25,31 25,53 25,53 30,10
4904 ,76 4896 ,77 4819 ,46 4810 ,06 4794 ,54	135 200 200 225 250	18 ,24 18 ,25 15 ,95 15 ,95 15 ,96	2416 ,42 2283 ,93 2253 ,07 1822 ,50 1015 ,023	7 7 7 6 7	30,42 30,52 30,52 25,09 12,21
4768,68 4740,40 4572,13 4343,62 4132,48	150 150 100 100 200	19,68 20,00 19,05 18,57 19,00	1008,777 561,738 561,680 561,530 557,118	6 7 7 7 7	12,29 24,32 24,32 24,32 22,25
3860 ,98 3860 ,80 3850 ,97	100 150 100	19 ,17 19 ,17 19 ,17	556 ,605 556 ,232 Cl IV, ionizatio	7 6	22 ,27 22 ,29
3843 ,26 3833 ,40	100 200	20 ,50 21 ,48	3076,68	6 potenti	30,87
3827 ,62 3820 ,25 3353 ,39 3329 ,42	150 100 125 150	21 ,48 21 ,48 18 ,03 20 ,06	3063 ,13 2782 ,47 2751 ,23 2724 ,03	5 7 5 5	30 ,75 31 ,29 31 ,21 31 ,21
3315,44	100	18,59	984,952	7	12,75
2688 ,04 2676 ,95 2658 ,74 1079 ,08	150 100 100 15	18,57 18,59 19,00 11,58	554 ,619 552 ,017 537 ,606 535 ,666	7 7 9 7	22 ,52 22 ,52 23 ,23 23 ,21
1071 ,76	10	11,65	534 ,727	8	23,18
1071 ,05 1063 ,83 961 ,49	20 10 10	11 ,58 11 ,65 14 ,34	486 ,172 Cl V, ionizatio	8 n potentia	27 ,21 1 67,81 eV
834,67	10	14,85	547,630	10	33,47
Cl III, ionization	potential	39,912 eV	546 ,329 545 ,114	6 1 0	33 ,52 33 ,47
4608 ,21 4596 ,22	5 4	27 ,01 26 ,87	542 ,297 542 ,229	6 8	23,05 33,52
4591 ,10 4523 ,33 4370 ,91	4 4 4	27,02 25,01 25,09	538 ,032 392 ,433	5 5	23 ,04 31 ,78
4059,07	6	25,31	Cl VI, ionizatio	n potentia	1 96,70 eV
4018,50 3748,81	6 8	25,36 25,42	555 ,485	20	34,70
3720,45	8	25,53	551 ,992 325 ,161	10 25	34 ,70 50 ,51
3612,85	8	25,01	323 ,936	20	50 ,51
3602 ,10 3560 ,68	9 8	25 ,09 26 ,84	323 ,356 243 ,854	15 12	50 ,51 63 , 22
		ARGON	z, $Z = 18$		
Ar I, ionization	potential	15,759 eV	13622 ,38 13503 ,99	500 850	14,06
20986 ,10 20616 ,21 13718 ,77	155 356 1000	13,86 13,90 13,98	13367 ,38 13313 ,39 13273 ,05	850 800 600 750	14,01 14,10 14,21 14,24
,		, "	, -	= =	· ,— -

λ, Å	I	$E_{_{ m B}}$, eV	λ. Α	[E _B , eV
12487,63	700	14,07	1066,660	15	11,62
12439 ,19	500	13 ,90	1048,218	25	11,83
10470,051	500	12,91	835,003 834,397	$\frac{6}{6}$	14 ,85 14 ,86
9784 ,5010	1000	13,09	004,007	U	14,00
9657,7841	1500	12,91	Ar II, ionizatio	on potential	l 27,628 eV
9224 ,4955 9122 ,9660	1000 500	13 ,17 12 ,91	10812,901	12	19,76
			10764,378	8	24,31
8521,4428	2000	13,28	10683 ,050	12	19,49
8424 ,6473 8408 ,2094	$2500 \\ 3000$	13,09	10638 ,121	8	24,65
8264,5221	1500	13 ,30 13 ,33	10519 ,510	9	2 4 , 19
8115,3108	5000	13,08	10467 ,173	20	19,68
8103,6920	2000	13,15	10111,595	8	21,50
8014,7853	800	13,13	9967,045	12	24,19
8006,1566	600	13,17	9854,065	8 10	25 ,45
7635 ,1056	500	13,17	9849 ,460		25,45
7503,8685	700	13,48	8771,855	15	19,87
5650,7054	1500	15,10	6886,618 6863,535	$\frac{20}{20}$	49, 49 19,55
5495,8760	1000	15,33	6756,548	20 20	19,61
5187,7507	800	15,30	6684,307	50	19,55
4702,3155	1200	14,46	6643,716	100	19,49
4628,4409	1000	14 ,51	6639,743	30	19,45
4596,0964	1000	14,52	6638,226	50	19,61
4522 ,3238	800	14,46	6483,076	20	19,97
4510 ,7335 4345 ,167	1000 1000	14 ,58 14 ,66	6243 ,125	25	19,68
4335,3381	800	14,69	6172,290	40	21,13
	1000	14,69	6114,929	50	21,14
4333,5612 4300,1011	1200	14,05	5145,319	25	19,55
4272,1690	1200	14,52	5141 ,790 5062 ,036	20 30	21 ,14 19 ,26
4266 ,2868	1200	14 ,53	I.		
4259,3617	1200	14 ,74	5017 ,160 5009 ,334	$\begin{array}{c} 20 \\ 30 \end{array}$	21 ,13 19 ,22
4251 ,1850	800	14,46	4965,073	25	19,76
4200,6746	1200	14,50	4933,206	$\frac{26}{25}$	19,26
4198,3176	1200	14 ,5 8	4879,860	30	19,68
4191,0288	1200	14,66	4847 .815	25	19,30
4190 ,7138	600	14 ,51	4806,017	35	19,22
4181,8837	1000	14,69	4764,862	25	19,87
4164 ,1795	1000	14,52	4735,905	25 25	19,26
4158,5906	1200	14,53	4726 ,859	25	19,76
4044 ,4185 3948 ,9785	$\begin{array}{c} 1200 \\ 2000 \end{array}$	14 ,69 14 ,69	4657,893	25	19,80
	2000		4609 ,560 4589 ,896	25 25	21 ,14 21 ,13
3947,5048	1000	14,69	4579 346	$\frac{25}{25}$	19,97
3834,6788	800	15,06	4545,045	$\frac{25}{25}$	19,87
3770,3698 3690,8960	$\frac{400}{300}$	15, 01 14, 91	4430,192	20	19,61
3675 ,2367	300	15,20	4426,005	$\frac{25}{25}$	19,55
•			4400,988	20	19,22
3649,8330	800	15,22	4379,667	20	19,64
3634 ,4605 3632 ,6837	$\begin{array}{c} 300 \\ 300 \end{array}$	15 ,03 15 ,03	4371 ,329	20	19,26
3606,5224	1000	15,06	4348,063	50	19,49
3572,2960	300	15,30	4331,199	25	19,61
	200		4277,524	20	21,35
3567,6562 3554,3056	$\begin{array}{c} 300 \\ 300 \end{array}$	15 ,02 15 ,03	4266,528	25 20	19,55 10,68
3461 ,0785	300	15,20	4228,162	20	19,68
3373,4823	300	15,30	4103,913	20	22,51
3319 ,3446	300	15,28	4072,006	25	21,50

			"	1	
λ, Å	I	E _B , eV	λ, Â	I	E _B , eV
4013 ,858	25	19 ,49	883 ,179	9	14,23
3968,360	20	19,55	879,622	8	14,23
3928,629	25	19 ,97	878,728	12	14,11
3868 ,524	20	23 ,17	875,534	9	14,30
3850,578	30 25	19,97 $22,77$	871,099 769,152	10 12	14 ,23 17 ,86
3780 ,841 3765 ,269	$\frac{25}{20}$	$\frac{22}{22},51$	643,256	9	19,47
3729,310	30	19 ,97	641 ,808	12	19,46
3588,448	30	22,95	637,282	$\frac{12}{20}$	19,46
3582,362	20	23,07	553,470	9	22,40
3581 ,608 3576 ,611	18 25	23 ,10 23 ,01	529 ,900 508 ,434	9 9	23,40 24,38
3561 ,031	$\frac{20}{20}$	24,62		-	
3559,508	25	23,16	Ar IV, ionizati		
3545,842	18	24,62	2926 ,33 2913 ,00	11 12	35,99 36,16
3545 ,597 3535 ,319	18 18	23 ,26 22 ,81	2809,44	16	35,65
3514,388	$\overset{\circ}{20}$	$\frac{22}{79}$	2788,96	14	35,55
3491,538	25	22 ,77	2784 ,47	12	37,70
3491,243	20	22 ,81	2757,92 2640,34	14 15	37 ,74 35 ,93
3476 ,749 3249 ,801	20 1 5	22 ,79 23 ,12	2624,92	13 12	37 ,97
3243,689	14	23,08	2621,36	12	37,98
3169,667	1 5	23 ,17	2615,68	12	35 ,85
2979,051	15	21 ,43	2599,47	12	36,67
2942 ,892 2891 ,612	20 18	21 ,35 21 ,43	$\begin{array}{ccc} 12562,17 \\ 2513,28 \end{array}$	12 12	35,86 36,17
1889,029	6	21,43	850,602	25	14,58
1873 ,140	6	24,31	843 ,772	20	14,69
1600,694	6	24,15	840,029	15	14,76
1574,992	6 10	21,35	801 ,409 801 ,086	10 10	18,10 18,09
932,0528 919,7815	10	48, 13 48, 13	689,007	12	20,62
745 ,323	7	16,81	683,278	10	20,76
744,925	8	16,64	ArV, ionizatio	on potentia	1 75,02 eV
740 ,270 679 ,400	10 6	16 ,75 18 ,43	827,055	5	15,09
676,241	$\overset{6}{6}$	18,33	709,195	5	17,58
666,010	6	18,62	558,481 527,693	$rac{5}{6}$	24 ,22 23 ,75
Ar III, ionizati	on potential	40,908 eV	524 ,189	5	$\frac{23}{75}$
3795,37	20	29,79	463 ,938	7	26 ,97
3503 ,58 3480 ,55	15 20	27 ,91 27 ,94	461 ,227 449 ,065	6	26,97
3391 ,85	20 1 5	30,18	446,949	1 8 8	27 ,86 27 ,83
3358 ,49	15	28,06	445 ,997	5	27 ,80
3344 ,72	20	28,08	337 ,998	6	36,93
3336,13	25	28,10	Ar VI, ionizatio	on potentia	1 91,32 eV
3311 ,25 3301 ,88	$\begin{array}{c} 15 \\ 20 \end{array}$	25 ,36 25 ,37	551,371	8	22,76
3285 ,85	$\overline{25}$	25,39	462 ,007 461 ,227	$\frac{25}{6}$	27 ,11 39 ,28
2317,47	15	31,28	459 ,320	10	39,64
2302 ,17	15	31 ,31	457,475	20	27,10
2192 ,06 2177 ,22	$\begin{array}{c} \textbf{15} \\ 25 \end{array}$	33 ,75 31 ,08	294,052	6	42,44
2170,22	$\frac{20}{20}$	31,08	282 ,423	6	56,55
2166,19	15	31,08	Ar VII, ionizatio	on potentia	l 124,03 eV
2133,87	1 5	33,75	585,754	15	21,17
887 ,404	10	14 ,11	479,379	12	40,19

					
λ. Â	I	E _B . eV	λ, λ	I	E _B , eV
475 656	Q	40.40	990.975	7	74 70
475,656	8	40,19	230,875		71,40
250,940	7	63,73	180,254	15	86,48
192,635	7	78,69	179,400	10	86,47
176,566	10	70,22	158,923	8	78 ,01
Ar VIII, ioniza	tion potenti:	al 148,49 eV	·		
700 ,24	10	17,70			
		POTASSI	UM, Z = 19		
KI, ionizatio	on potential	4.340 eV	3618,49	6	23,57
11772,83	17	2,67	3530,75	7	2 4 ,1 5
11769,62	16	2,67	612,621	4	
11690,21	17	$\frac{2,67}{2}$	607,931	$\tilde{5}$	
11022,67	16	3,80	600,765	$\ddot{6}$	
11019,87	17	3,80	495,144	$\ddot{6}$	
11010,07			485,084	5	
7698,959	24	1 ,61			
7664,899	25	1,62	K III. ionizatio	n potentia	ıl 45.747 eV
6938,767	20	3 ,40	497,104	15	24,94
6911,084	19	3,40		15	
5831 ,887	17	3 ,74	471,569	20	$26,56 \\ 26,37$
,	A ***		470,089		
5801 ,752	17	$\frac{3}{2},75$	466,793	15	26,56
5782,384	16	3,75	448 ,595	15	27,91
4047,206	17	3,06	444,344	15	27 ,90
4044 ,136	18	3 ,07	440,429	15	
KII, ionizati	on potential	31,817 eV	434,722	15	27,90
•			KIV, ionizatio	n notentia	1 60.909 eV
5056,27	7	$\begin{array}{c} 22,\!71 \\ 22,\!71 \end{array}$	lj .	_	•
5005,60	8		745 ,264	10	16,64
4829,23	9	22,71	741,950	10	16,92
4608,45	8	23,33	737,144	10	16,82
4505,33	6	23 ,14	646,188	15	21,22
			393,142	10	31 ,74
4388,16	7	23,46	KV, ionizatio	n potenti	al 82.6 eV
4309 ,10	7	23 ,51	724,420	- 8	17,11
4305,00	7	23,33	603,429	8	25,51
4263,40	7	23,14	586,322	8	24,15
·	7	23,33	580,319	7	24,34
4225,67	$\overset{\bullet}{7}$	20,55	425,588	7	32,14
4222 ,97		23,57		10	36,29
4186,24	8	23,11	372,148	7	44,26
4149,19	7	23,46	300,252	•	
4134,72	7	23,14	KVI. ionizatio	on potenti	al 99,741 eV
4114,99	6	23,25	968,518	6	
4001,24	7	23 ,57	724,420	8	17,48
3972,58	6	23 ,51	623,016	8	20,26
3966,72	6	23,57	616,136	6	20,26
3897,92	8	$\frac{23}{33}$	488,120	10	27,75
•			- 6		
3783 ,19	6	23,51	464,270	10	27,07
3767,36	6	23,53	460,438	8	27,07
3681 ,54	6	23,51	458,048	7	27 ,07
			$\mathbf{JM},\mathbf{Z}=20$		
Ca I, ioniza	tion potentia	1 6,113 eV	13134,96	400	5,39
40064 70	500	9 59	13033,41	300	5,39 5,30
19861,70	500 250	2,52 4,53	12909,07	200	5,39
19852,96	250	4,53	12818,69	400	4 ,88
19776,67	2000	2,53			
19505,62	500	2,52	10343,85	500	4 ,13
19452 ,82	1500	2,52	7326,146	400	4,62
19369,43	500	2,52	7202,194	200	4,43
10000,10	000	_ ,~ -	·		,

λ, Δ	[$E_{\mathrm{B}},\;eV$	λ, Α	I	E _B , eV
7440 445	50 0	, ,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0	97.97
7148 ,147	500	4,44	1 2899,78	9	34,34
6717,685	500	4 ,55	2881,80	7	34,54
6462,566	125	4 ,44	2869,95	7	34,39
6439,073	150	4,45	2866,57	7	35,03
6162,172	150	3,91	2813,88	7	34,85
6122,219	100	3,91	2687,78	8	34,68
5857 ,454	100	5,05	528 ,286	8	-
			409,971	18	30,24
5594,468	60	4,74	403,732	$\frac{10}{20}$	30,71
5588 ,757	80	4 ,74	357,973	8	,,, <u>,</u>
5270 ,270	60	4 ,88			
781, 4454	80	4,68	∥ Ca IV, ionizati	on potenti	al 67.196 eV
4434 ,960	60	4 ,68	669,725	10	18.00
4226 , 728	500	$^{2},93$		15	18,90
			656,038		18,90
Ca II, ionizatio	n potential	11.870 eV	450,565	10	27,52
9890,63	11	9,69	443,821	15	28,32
8927 ,36	11	8,44	434,570	12	28,53
8912,07	10	8,44	336,555	15	37,22
8662,140	16	3,12	335,374	$\overline{25}$	36,97
8542,089	17	3,15	321,593	10	38,94
0042,000	1,		318,093	15	38,98
8498 ,018	13	3 ,15	li .		
8248,797	11	9,02	Ca V, ionizatio	on potenti	al 84,39 eV
8201,720	10	9,02	646 ,570	8	19 ,17
3968,468	22	3,12	558,602	10	
3933,663	23	3,15	542,290	10	
			425,000	15	
3736,901	18	6,47	352,915	9	37,46
3706,026	17	6,47	to Li	•/	,, ,1 0
3181,275	15	7,05	322,166	10	
3179,332	18	7,05	286 ,965	9	48,63
3158,869	17	7,05	267 ,772	8	48,63
1840,061	8	8 ,44	Ca VI, ionizat	ion potent	tial 109 eV
1838,008	7	8 ,44	505 ,199	8	_
Ca III, ionizati	on potential	51.218 eV	373,997	7	36,55
2527 75	7	22 75	370,022	7	36,85
3537,75	7	33 ,75	340,528	8	39 ,81
3372,68	8	33,75	239,535	7	55 ,16
3119,66	8	34,68			
2988,61	7	34,39	229,734	7	53,97
2924 ,33	8	34 .95	228,628	7	54,23
		TITANIU	JM, Z = 22		
Ti I, ionizati	ion potentia	1 6,836 eV	8377,90	100	2,31
			4981,732	60	$\frac{2}{3},34$
9705,64	80	2,40	4534,782	60	3,57
9675,55	90	2,12	4533,238	80	3,58
9638,28	100	2,13			
8692,34	100	2,47	4305,910	60	3,73
8682,99	125	2,48	3998,635	100	3,15
8675,38	150	2,50	3989, 758	80	3,13
8548,07	100	3,32	3981,761	70	3 ,11
8518 ,37	100	3,33	3958 ,206	80	3,18
8468,46	100	3,35	3956,336	60	3,15
8435,68	300	2,31	3948 ,670	60	
·			3752,860	80	3,14 3,35
8434,98	300	2,32	3741,059	60	3 ,35 3 ,33
8426,50	200	2,30	3653,497	100	0,00 2.7.7
8412,36	15 0	$^{2},^{29}$	1. 0000,401	100	3,44
		- ,	!		
8396,93	90	2,29	3642 .675	80	3 42
		2 ,29 2 ,29	3642 ,675 3635 ,462	80 80	3 ,42 3 .41
8396,93	90	2,29	3642 ,675 3635 ,462 3371 ,447	80 80 80	3,42 3,41 3,72

λ. λ	I	$E_{_{ m B}}$, eV	λ, Å	I	EB, eV
3354,634	60	3,72	2884 ,099	70	5 ,43
3199, 915	100	3 ,92	Ti III, ionization	n potentia	l 28.143 eV
3191 ,994	80	3,90	2516 ,01	20	9,69
3186,451	60	3,89	1498,65	30	9,32
2956,18	70 60	4,24	1455,22	40	10,30
2948 ,38 2941 ,963	$\frac{60}{60}$	4,22 4,21	1422 ,41	25	10,05
Ti II, ionizatio			1298 ,95	40	9 ,57
,	-	,	1298,67	50	9,60
4549,622	60	4,31	1295,91	30 50	9,57
4395 ,031 4300 ,052	60 60	3,90 4,06	1294 ,67 1293 ,26	30 30	$9,60 \\ 9,64$
3913,464	6()	4,28	1289,32	30	9,64
3900,546	70	4,31	1286,38	40	9,69
3761 ,320	200	3,87	Ti IV, ionization	n potentia	1 43,245 eV
3759 ,291 3685 ,192	$\frac{200}{250}$	3 ,90 3 ,97	2546 ,85	12	29,28
3641,330	100	4,64	2068,16	15	15 ,96
3624,826	70	4,64	1467,25	30	24,41
3504,890	80	5 ¹ ,43	1451 ,75	30	24 ,40
3383,761	125	3,60	781,78	20	15,86
3372 ,800	100	3,69	779 ,14	20	15 ,96
3361,213	$\begin{array}{c} 125 \\ 125 \end{array}$	$\frac{3}{3},72$	Ti V, ionizatio	n potentia	al 99,8 eV
3349,399		3,75	228,898	75	54,16
3349 ,035 3341 ,875	75 100	4 ,31 4 ,28	225 ,337	100	55,02
3329,455	70	3,86	Ti VI, ionization	notential	I 119.762 eV
3322 ,936	75	3,88	199,759	6	62,79
3236,573	70	3 ,86	198,974	8	62,31
3234,517	7 5	3 ,88	194,900	7	64,32
3088,027	7 5	4,06	192 ,747	8	64,34
		IRON	, Z = 26		
Fe I, ionizati	on potentia	1 7.897 eV	3020,4918	15 0	4,19
8688 ,632	1500	3,60	2983,5714	125	4,16
8661 ,907	600	3,65	2166,773	100	5,72
8387,780	1200	3 ,65	2084 ,117	50	5 ,94
8327,063	1200	3,68	Fe II. ionizatio	on potenti	al 6,182 eV
8046 ,073	600	4,42	7320,70	40	5,58
7998,972	700	5,92	7307,957	50	5,58
7937,166	700 800	5 ,87 5 ,82	6456,376	200	5,82
7511 ,045 7207 ,406	500 500	5,87	6247,562	80 30	5 ,87 5 ,90 .
7187,341	800	5,82	6147 ,735		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
6677,994	600	4,55	5962,4	$\frac{30}{20}$	
6494,985	1000	4 ,31	5427 ,832 5136 ,795	30 35	5,25
6400,013	800	5,54	2453,935	25	10,27
3878,5745	100	3,28	2445,114	40	10,27
3859 ,9132	300	3,21	2255,691	5()	10,28
3825 ,8834 3820 ,4274	$\frac{200}{250}$	4 ,16 4 ,11	2251 ,831	80	10,27
3749 ,4875	200	4,11	2249,063	30	10,32
3737 ,1333	150	3,36	2247,692	35 45	10,30
3734 ,8659	300	4 ,18	2245 ,505	45	10,28
3719 ,9367	250	3,33	2228,761	30	10,37
3581 ,195	250	4,32	2218,289	$\frac{30}{30}$	38, 10 38, 10
3440,6069 3024,0743	150 150	3,60 4,16	$\begin{array}{c} 2208,419 \\ 2093,683 \end{array}$	35	9,69
3021 ,0743 3020 ,6405	200	4,10	2000,368	30	8,71
1			,		3

λ, Å	I	E _B , eV	λ, Å	I	EB, eV
1787 ,997 1786 ,738	35 40	9 ,82 9 ,83	1895 ,456 1890 ,669	20 13	10 ,27 14 ,42
1785 ,262 1639 ,403	$\begin{array}{c} 40 \\ 30 \end{array}$	9 ,81	Fe IV, ionizat	ion potenti	
1636,334	30 30	7 ,68 7 ,68	1647,05	45	21,00
1635 ,389	35	8 ,57	1640,03	65	21,10
1631 ,124 1629 ,155	$\begin{array}{c} 30 \\ 30 \end{array}$	7,68	1630 ,99 1479 ,65	75 39	21 ,21 23 ,16
1621,685	30 30	7,69 7,69	1475 ,67	28	$\frac{20}{23},05$
1608,446	35	7,71	1472 ,13	35	23,10
1144,946	35 35	10,82	1464 ,81 1459 ,92	40 40	$28,29 \\ 28,22$
1112,086 1096,886	$\begin{array}{c} 35 \\ 30 \end{array}$	$\begin{array}{c} 11,26 \\ 11,29 \end{array}$	1259,54	30	30,90
1071,596	30	11,64	576 ,8	40	21,49
932,687	30	13,37	574 ,5 526 ,28	50 75	21,58
932 ,244 930 ,558	30 30	13 ,40 13 ,40	525,68	100	21 ,32 21 ,58
930,165	30	13,37	Fe y, ioniza	tion potent	ial 78 eV
930,030 929,612	30 30	13 ,41 13 ,42	1464,73	6	32 ,87
929,538	30	13,38	1448 ,91	6	31,76
928,107	30	13,40	1440 ,59 1430 ,61	7 8	31 ,88 32 ,02
927 ,176 923 ,884	30 30	13,42 13,42	1409,51	$\ddot{7}$	32,15
Fe III, ionizati		·	1409 ,19	6	32,00
		· i	1406,78 1402,45	$\frac{7}{6}$	33 ,22 33 ,13
5929 ,69 4372 ,81	18 20	$20,60 \ 25,74$	1376,45	6	32,16
4164,73	20	23,61	1373 ,68	6	32,30
3288 ,81 3276 ,08	15 15	14,09 14,09	422 ,287 418 ,033	$\frac{6}{6}$	33,05
3266 ,88	20	14,00	417,382	6	32 ,78 32 ,87
3120,847	20	15,12	392 ,907	6	34,72
3013 ,167 3007 ,275	$\frac{20}{20}$	14,42	384,957	6	32,36
2295 ,859	15	22,91 16,30	365 ,858 365 ,440	6 6	33 ,98 34 ,08
2174 , 658 2151 , 776	15 15	14,84 16,66	Fe VI, ionizati	ion potenti:	
2097,480	15	14,67	312,263	7	43,26
989, 2078 1994, 073	14 13	11,04 14,09	311 ,702 304 ,551	7 7	43 ,39 43 ,26
1987,503	15	14,10	304,221	7	43 ,39
, 1960 ,318	13	16,22	297,568	8	45,28
1953 ,322 1943 ,481	13 14	15 ,11 14 ,25	297,308	7	45,26
1937 ,345	14	14,27	296 ,988 294 ,520	6 7	44 ,10 42 ,09
1931,507	14	15,06	294,265	7	42,19
1930 ,387 1926 ,304	15 18	14,29 10,16	293,966	8	42 ,32
1922,789	15	14,32	293 ,745 292 ,736	8 7	42,45
1915,083	15	14 ,34	291,229	6	42,60 46,13
1914 ,056	19	10,21	291 ,184	6	42,82
		COPPER	, Z = 29		
Cu I, ionizati	on potential	7,726 eV	5782 ,132 5700 240	1500	3,79
8092 ,634 7933 ,130	2000 1500	5,35	5700 ,240 5292 ,517	1500 1650	3 ,82 7 ,74
7955 ,150 M	1900	5 ,35			

	1	71			
λ. Α	I	$E_{\mathbf{B}}$, eV	λ, .ί	I	E _B , eV
5218 ,202	2500	6 ,19	2884 ,196	60	13,39
5153,235	2000	6,19	2544,806	100	13,39
5105,541	1500	3 ,82	2403 ,338	100	43,39
4651 ,124	2000	7 ,74	2369 ,890	100	8 ,4 9
4062 ,641	2000	6 ,87	2246,995	7 5	8 ,23
3530,383	2000	5 ,15	2210 ,259	60	86, 8
3307,948	2500	8,82	2192 ,268	7 5	8,49
32 7 9 ,815	2000	5,42	2179 ,399	60	8,66
3273 ,957	10000	3,79	2148 ,974	60	8 ,49
3247,540	10000	3 ,82	2135 ,976	75	8,52
3063,411	2500	5 ,69	2054,969	50	8,86
3036,101	2500	5,72	2043,791	60	8,78
3010 ,838	2000	5,51	1621,426	60 60	16 ,56 16 ,56
2997 ,364 2961 ,165	$\frac{2000}{2500}$	5 ,78 5 ,57	1593,556	60	
•			1541,703	75 CO	16,56
2766,371	2500	6,12	1519,837	60 7 5	16 ,82 16 ,56
2618 ,366 2492 ,146	$\frac{2500}{2000}$	6 ,12 4 ,97	1488,637 1063,003	60	16,56
2406,665	1500	$\frac{1}{6}, \frac{3}{79}$	1060,630	60	14,52
2392,627	2500	6,82	1059,096	60	14,96
2293,842	2500	6 , 79	1055,050	60	14,99
2263,079	$\frac{2300}{2200}$	7,12	1054,690	60	15,01
2244,265	$\frac{2300}{2300}$	5,52	1044,743	80	15,12
2230,084	2500	6,95	1044,516	80	14 ,59
2225,697	2100	5,57	1039,569	60	14,76
2214,581	1600	6,98	1039 ,345	60	14,65
752, 2199	1300	7,28	1036 ,470	60	15,22
2199,583	1700	7,02	945,524	60	16 ,09 15 ,97
2181 ,720 2178 ,944	1700 1600	5 ,68 5 ,69	943,328	60	·
•			935,892	60 60	15 ,97 16 ,23
2165,093	1300 100	5 ,72 6 ,79	935 ,074 932 ,940	60	16,01
1825 ,348 1774 ,820	$\frac{100}{200}$	6,98	914,209	80	16,28
1741,574	50	7,12	896,753	60	16,66
1725,664	50	7 ,18	893,674	80	16,59
1713,364	50	7,24	890,567	60	16,75
1703,843	30	7,28	886,946	60	i6 ,70
1691,076	30	8,72	Cu III, ionizatio	n potential	36,834 eV
1688,093	30	8,73	1750 ,391	500	15,63
1655 ,318	30	8,88	1741,378	500	15 , 4 3
Cu II, ionizatio	-	20,291 eV	1722,379	1000	14,74
8283,21	60	16,56	1709,036	700 500	95, 14 15, 11
7988 ,17 7807 .66	60 7 5	16,56 16,56	1702,994		
7807 ,66 7664 ,70	75 75	16,58	1687,134	600 500	15 ,04 15 ,19
7404,70	100	16,56	1684 ,642 1674 ,602	500 500	15,19 15,95
6273 ,330	60	16 ,95	1671,886	500	15,30 $15,72$
6216,910	60	16,96	1670,140	500	15,73
5051 ,778	60	16,88	1642,208	2000	15,09
4931 ,653	100	16 ,85	1600,194	500	15,44
4909 ,726	100	16 ,85	1593,758	1000	15,32
4043,502	75	11 ,85	1543 ,438	500	19,07
		KRYPTO	$\mathbf{N}, \mathbf{Z} = 36$		
Kr I, ionizatio	n potential	13,999 eV	16935,71	800	12,26
24000 54	2250	12,11	16896,58	700 1000	12,04 12,18
21900 ,51 18167 ,12	1500	12,11	16890 ,40	1000	12,10
10107,11		, –	••		, ,

÷			ii		
λ, Α	I	$E_{\mathbf{B}}$. eV	λ, Λ	I	E_{B} , eV
16784 ,65	950	12,28	7407,02	400	16,60
15335,29	850	12,11	7289,78	400	16,60
15239 ,85	900	12,26			
14734 ,46	900	12,28	5681 ,89 5333 ,41	40 0 50 0	16 ,87 20 ,86
14426,93	1100	12,38	5208,32	500	16,65
13634,22	1700	12 ,35	5125,73	400	19,57
13622,28	800	12,35	4846,60	700	17,25
13177,38	850	12,38	4832,07	800	16,83
12204,39	700	13,14	4765,74	1000	16,87
11819,43	2000	12,35	4739,00	3000	16,60
9751 ,759	2000	11 ,30	4680,41	500	17,65
8928,6920	2000	11,30	4658,87	2000	16,65
8776,7490	6000	11,44	4633,88	800	18,49
8508,8700 8298,1077	3000 5000	12,10	4619 ,15	1000	17,37
		11,53	4615,28	500	17,37
8281 ,0495	1500	12,14	4577,20	800	18,56
8263 ,2398 8400 ,0543	3000	12,14	4523 ,14	400	19,57
8190 ,0543 8112 ,900	3000 6000	11 ,55 11 ,44	4489 ,88	400	21,32
8104,3642	400 0	11,44	4475,00	800	18,62
			4436,81	600 500	$\frac{17}{47}, \frac{37}{28}$
8059 ,5038 7854 ,8215	1500 800	12,10 12,14	4431 ,67 4355 ,47	3000	17 ,38 16 ,83
7694,5393	500	11,53			
7685,2460	400	12,26	4317,81	500	19,47
7601,5443	2000	11,55	4292,92 4088,33	600 500	17,16 18,88
7587,4130	1000	11,67	4065,33	300	18,87
5870,9153	3000	12,14	4057,01	300	18,87
5570 ,2890	2000	12,14	3920,14	200	20,00
5562,2254	500	12,14	3906,25	150	20,00
4502,3546	600	12,78	3875,44	150	$\frac{25}{20}, \frac{37}{77}$
4463,6901	800	12,81	3783,13	500	20 ,11
4453 ,9177	600	12 ,82	3778,09	500	20 ,15
4362,6424	500	12,76	3744 ,80	150	20,47
4319 ,5798 4318 ,5523	1000 40 0	$\frac{12}{12}$,78	3741,69	200	21 ,81
		12 ,78	3 7 21 ,35	150	20,71
4273,9700	1000	12,82	3718,63	200	20,71
3837 ,81 3812 ,2155	$\frac{30}{20}$	13,14	3718,02	300	21,89
3800,5437	30	13,28 13,29	3680,37	100	20,02
3796,8839	20 20	13,29	3653,97 $3631,87$	$\frac{250}{200}$	20,00 20,02
3773,4241	50		3607,88	100	20,02
3679,58	100	13,32 13,28	2833,00	100	20,86
3665,3259	80	13,29	2464,77	100	20,89
3615,4755	20	13,46	964,962	30	13,51
3502,5537	20	13,45	911,384	25	14,27
3431,7217	20	13,53	886,302	30	13,99
3424,9433	15	13,53	884 ,144	30	14,69
1235,839	13	10,03	868,869	25	14,69
1164,868	4	10,64	844,058 818,147	25 2 5	14,69 15,82
Kr II, ionization	potential	24.570 eV	782,084	$\frac{25}{25}$	15,82 15,85
10221,46	1000		752,051	30	16,48
9803,14	500	16,83	722,036	50	17 ,17
9619,61	400		KrIII, ionizatio	n potential	36,947 eV
9605 ,80	500			_	
9577 ,52	500	17,37	6651 ,75 6602 ,90	10 10	22,33 $24,56$
9361,95	300	18,49	6310,22	10	24,56
9293,82	500	$\frac{10}{22}, 17$	6078,38	10	$\frac{24,30}{22,33}$
9238,48	50 0	18,21	6037,17	10	$\frac{24}{65}$
42					

					
λ, Å	ı	$E_{_{\mathbf{B}}},\;eV$	λ. Å	I	$E_{\rm B}$. eV
5501,43	10	24 ,17	676,564	25	18,32
5016,45	20	25.45	672 ,330	25	18,44
4988 ,52 4710 ,48	10 10	25,86 $24,26$	663,039	20	20,51
4536,46	10	26,32	659,716	22	18,79
4443,28	15	23,89	646 ,417	20	19.18
4294,83	10	24,56	i	Kr IV	
4226,58	25	24,03	3224,99	6	25 , 89
4225 ,92 4171 ,79	20 15	24 ,56 21 ,76	2774,70	6	25,84
4154,46	40		2748 ,18 2621 ,11	8 7	25 ,89 25 ,32
4131,33	40	$24,17 \\ 21,79$	2615,3	8	25,72 25,72
4067,37	50	24,23	2609,5	10	26,13
3564,23	100	22,27	2519,38	6	25,90
3507,42	200	22,33	2459,74	6	25,89
3488,59	100	24,07	2291,26	$\begin{array}{c} 6 \\ 22 \end{array}$	26,39
3439 ,46 3351 ,93	100 100	23,89 21,76	842,035		14,72
3325,75	200	$\frac{21.70}{21.79}$	816 ,822 805 ,763	18 7	15 ,18 15 ,39
3268 .48	100	24,03	003,703		15,55
3264,81	150	24,26	i i	Kr V	
3245,69	300	21,88	708,85	8	_
3191 ,21 3189 ,11	80 100	$\begin{array}{c} 24,17 \\ 22,33 \end{array}$	472 ,16	3	_
3124,39	100	25,15		Kr VI	
3024,45	80	24,56	742,83	8	
2892 ,18	100	24,26	705,84	8	_
897,801	40 90	14,37	569 ,13 554 ,52	5 5	_
876,674 870,825	$\frac{22}{20}$	14,80 14,80	544,03	5	
	35		465,27	$\ddot{6}$	
862 ,578 854 ,733	35 25	14 ,37 15 ,07		Kr VII	
837,666	22	14,80	619 67	1	
785,968	25	17,59	618,67 $585,37$	8	_
722 ,036	50	17,17	,,,,	Kr VIII	
698,037	20	18,32	COE OA		
686 ,254 680 ,119	20 22	18,07 18,79	695 ,91 651 ,57	8 10	_
			z, z = 54		
el, ionization	n potential	12,129 eV	8739,39	300	11,00
15418,01	110	10,60	8409 ,190	2000	9,79
14732,38	200	10,56	8346 ,823	2000	11 ,05
13656 ,48	150	10,60	8280 ,1163	7000	9 ,93
12623,32	300	10,56	8266,519	500	11,07
11085 ,25	250	11 ,27	8231 ,6348	10000	9,82
10895,32	200	11,05	8206 ,341 7967 ,341	700 500	96, 10 11,00
10838 ,34 9923 ,192	1000 3000	9,58 89,69	•		
9799,699	2000	9.58	7887 ,395 7642 ,025	300 500	11 ,14 11 .07
9162 ,654	500	9 ,79	7642 ,025 7119 ,598	500 500	11 ,07 11 ,46
9045 ,446	400	9 ,69	6882 ,155	300	11,49
8987 ,57	200	11,06	6469 ,705	300	11,50
8952 ,254	1000	9,82	6318,062	500	11,68
8930 ,83 8908 ,73	$\frac{200}{200}$	10,96 10,97	6182,420	300	11 ,69
		1	5823,890	300	11,57
8862 ,32 8819 ,412	300 5000	10,98 9,72	4923 ,1522 4916 ,508	500 500	10,95 10,96
OOTO (415	JAM'	· · · · · · · · · · · · · · · · · · ·	7010 ,000	900	10,50

λ, Å	I	$E_{_{ m B}}$, eV	λ, Å	I	$E_{_{{f B}}}^{},~{f eV}$
4843 ,294 4829 ,709 4807 ,019 4734 ,1524 4697 ,020	300 400 500 600 300	10 ,99 11 ,00 11 ,01 11 ,05 10 ,95	4180 ,10 3907 ,91 3461 ,26 3366 ,72 3121 ,87	1000 100 100 300 250	16,82 17,24 17,38 17,78 17,36
4671,226 4624,2757 4582,7474 4524,6805 4500,9772 1469,610	2000 1000 300 400 500	10,97 10,99 11,14 11,05 11,07 8,44	3104,40 3017,43 2979,32 2907,18 2895,22 2864,73	70 100 300 80 150 150	17,38 — 17,36 17,40 18,51 17,38
1295 ,587 1100 ,46 Xe II, ionization 9698 ,68	8 15 n potential 50	9,57 — 21,208 eV 14,48	2854,53 1100,432 1074,476 1051,920 1048,272	60 10 15 10 8	17',40 11',27 11',54 11',79 11',83
9591 ,35 8804 ,61	50 30	13,89	1040 ,272	9	11,03
8716,19	50	14,48	Xe III, ionizatio		•
8347 ,24 8297 ,55 8151 ,80 8038 ,26 8031 ,64	100 100 100 100 100	14 ,07 — — — —	6238 ,24 6221 ,66 5524 ,39 5401 ,04 5367 ,06	60 25 40 50 30	20,39 20,39 21,32 20,69 19,92
8008,45 7164,83 6990,88 6942,11	300 800 2000 1000	15,98 14,10	5238,95 4869,47 4723,57 4683,53 4673,66	60 40 30 60 30	20,69 20,16 18,20 18,22
6805 ,74 6595 ,01 6356 ,35 6097 ,59 6051 ,15 6036 ,20	1000 800 500 1000 1000 500	14,07 — 17,36 13,86 13,89 13,89	4537,33 4434,16 4285,89 4145,73 4109,07	30 50 30 100 100	20,39 19,92 19,92 20,63 20,12 19,71
5976,46 5419,15 5339,38 5313,87 5292,22	1000 2000 1000 800 1000	13,86 14,07 13,86 16,43 13,89	4060 ,43 4050 ,05 3950 ,56 3922 ,53 3880 ,46	60 200 300 500 60	22,81 18,63 18,20 18,22 19,71
5080 ,62 4921 ,48 4883 ,53 4876 ,50 4862 ,54 4844 ,33	600 800 600 500 800 2000	16,51 15,26 15,88 16,12 16,43 14,10	3877,80 3841,52 3780,98 3624,05 3583,64	200 100 300 600 80	20,39 19,92 18,85 18,48 20,65
4603,03 4585,48 4480,86 4462,19 4448,13	600 500 500 1000 500	14 ,48 16 ,80 17 ,24	3579,69 3522,83 3444,23 3268,96 3242,86	100 80 60 80 100	20 ,16 18 ,63 20 ,12 18 ,85 18 ,85
4395 ,77 4393 ,20 4330 ,52 4310 ,51 4296 ,40	500 500 1000 500 500	17,05 17,90 16,93 18,14 16,74	3091,06 3023,80 2948,06 2947,53 2945,25 2940,22	50 100 40 40 60	19,92 20,62 20,12 20,62 24,37 24,33
4245 ,38 4238 ,25 4193 ,15	500 500 500	16,80 16,80 —	2906 ,56 1232 ,074 1130 ,344 1017 ,680	50 25 30 35	20,65 12,18 12,18 12,18

λ, Λ	I	'E _B , eV	λ, Å	I	E _B , eV
1003,370	35	13,57		Xe VI	
896,003	20	13,84	880,04	2	
893 ,989 852 ,950	$\begin{array}{c} 20 \\ 25 \end{array}$	13 ,87 19 ,17	800,84	2	
824,881	30	15,03	599,84	3	_
823,210	25	15,06	1	Xe VII	
779,126	$\frac{25}{25}$	15,91		Ae vII	
698,541	20	17,75	995,50	3	_
	Xe IV		723,71	3	
	ACIV		698,02 566,04	$\frac{10}{2}$	
Experimental data	have not been	published.	300,04		
On p. 605 we gi	ve wavelengths	calculated		Xe VIII	
from levels given i	n tables.		858 ,59	3	
	Xe V		740,44	7	
			562,55	$\frac{2}{2}$	
682,56	3		517 ,00	2	
		CESIUN	A, Z = 55		
C I ismimali		9 907 -\$7	1977 400	50	4.6 94
Cs I, ionizati	on potential	3,894 eV	4277,100 3965,187	50 25	16,21 19,00
14694 ,93	1000	2,30	3959 ,495	$\overset{20}{20}$	16,51
10123,6025	1200	3,03	3925,583	25	19,04
10024,3595	1000 1000	$^{3,03}_{2,80}$	9000 000	00	40.05
9172 ,3217 8943 ,483	2000	1,38	3906 ,933 3805 ,096	$\begin{array}{c} 20 \\ 25 \end{array}$	19,05 18,94
			3785,424	20	19,39
8761,415	500 4000	2,80	3368,555	30	17,78
8521 ,149 8079 ,0332	1000	1 ,45 3 ,34	3271 ,626	20	17,77
7943 ,8820	800	3,01	3267 ,135	30	17,78
7608, 9032	500	3,01	3265,924	30 30	17,75
7279 ,9570	500	3,51	2940,953	$\overset{\circ}{20}$	17,55
7228,5356	500	3,51	2931,09	20	19,56
6973 ,2966	500	3,23	2816,943	20	23,40
6723 ,2943	500	3,23	2573,03	30	23,87
6586 ,5096	500	3,34	2273,83	20	24,50
4593 ,172	1000	2,70	2267,61	$\frac{20}{2}$	24,50
4555,280	2000	$\frac{2}{3}$,72	1191,55	8	24,50
3888 ,610 3876 446	150 300	3,19 3,20	1178,65	10	24,50
3876, 146 3611, 459	200	3,43	926,75	20	13,38
3476,814	100	3 ,56	901,34	20	13,75
	4 41 - 3	05 070 -37	813,85	20	15,23
Cs II, ionizatio	n potential	25,076 ev	808,77 668,43	20 12	15,33 18,55
5925,651	60	16,01	639,42	12	19,39
5831,159	60	15 ,88	000, 11		
5563,019	125 60	16,21	Cs III. ioniza	tion potential	34,6 eV
5419 ,687 5370 ,979	60 80	18,50 15,68		F-1	
			877,9	7	15,84
5358,53	500	20,23	782,6	$\frac{3}{2}$	15 ,84 17 ,16
5249 ,373 5227 ,002	80 200	16,12 15,68	722,2 645,0	∠ 4	19,22
5043,800	80	16,21	595,7	$\overset{1}{2}$	20,81
4603,755	60	16,01	i		
•	ra.		550,2	$\frac{2}{2}$	22,53 22,63
4363 ,275	50	19 ,05	547,8	4	22 ,63 4!
					/1

Section II Summary Table of Most Intense Lines Arranged According to Wavelength

					<u> </u>
λ, Å	Symbol	I	λ, Å	Symbol	I
40511,4 26877,82 24464,66 23636,3 22056,44 21900,51	H Li I Li I Ne I Na I Kr I	120 8 6 205 300 2250	14426 ,93 13821 ,72 13718 ,77 13656 ,48 13634 ,22	Kr I Cl I Ar I Xe I Kr I	1100 525 1000 150 1700
21163,75 21093,04 20986,10 20616,21 20581,30 20199,36	Al I Al I Ar I Ar I He I Cl I	13 12 155 356 10000	13622,38 13622,28 13581,33 13503,99 13429,61 13367,38 13346,76	Ar I Kr I N I Ar I N I Ar I Cl I	500 800 1200 850 670 800 550
19861,70 19852,96 19776,67 19766,78 19755,28 19505,62	Ca I Ca I Ca I Cl I Cl I Ca I	500 250 2000 185 717 500	13313,39 13296,01 13273,05 13243,83 13177,38 13165,11	Ar I Cl I Ar I Cl I Kr I O I	600 310 750 350 850 24 26
19452,82 19370,30 19309,43 18751,1 18746,0 18744,3 18703,09	Ca I Cl I Ca I H D T Li I	1500 227 500 700 700 700 7	13164,85 13163,89 13150,76 13134,96 13123,41 13033,41	O I O I Al I Ca I Al I Ca I	25 14 400 15 300 200
18696 ,94 18685 ,96 18390 ,10 18385 ,17 18282 ,58 18276 ,59	He I He I Ne I Ne I Ne I Ne I	1500 3600 180 160 200 260	12909,07 12818,69 12818,05 12814,56 12813,40 12623,32 12614,8	Ca I Ca I H D T Xe I C I	400 140 140 140 140 300 200
18167,12 17546,05 17002,38 16935,71 16896,58	Kr I Li I He I Kr I Kr I Kr I	1500 7 1800 800 700 1000	12487,63 12469,62 12461,25 12439,19 12204,39	Ar I N I N I Ar I Kr I C I	700 1350 680 500 700 200
16784,65 16750,56 16718,96 16198,47 15970,49 15959,97	Kr I Al I Al I Cl I Cl I Cl I	950 12 11 259 283 735	11834,3 11828,18 11819,43 11772,83 11769,62 11754,0 11747,5	Mg I Kr I K I K I C I C I	45 2000 17 46 600 300
15928,92 15883,34 15869,66 15730,06 15520,29 15465,07	Cl I Cl I Cl I Cl I Cl I	342 277 2780 1487 1094 381 110	11690 ,21 11656 ,0 11436 ,34 11409 ,68 11403 ,78 11381 ,45	K I C I Cl I Cl I Na I Na I	17 200 1000 269 12 11 15
15418,01 15335,29 15239,85 15108,04 15024,99 14931,70 14767,48 14734,46 14732,38 14694,93	Xe I Kr I Cl I Mg I Cl I Na I Kr I Xe I Cs I	35 294 1155 900 200 1000	11254,881 11253,190 11177,59 11143,09 11122,97 11085,25 11022,67 11019,87 10951,78 10914,23	Al I Al I Nc I Ne I Cl I Xe I K I K I Mg II Mg II	14 300 300 300 250 16 17 10

λ, Å	Symbol	I	λ, Å	Symbol	I
10895 ,32	Xe I	200	9534,167	Ne I	500
10869 ,5408	Si I	130	9486,680	Ne I	500
10844 ,54	Ne I	200	9425,38	Ne I	500
10838 ,34	Xe I	1000	9412,72	Si II	100
10834 ,87	Na I	8	9405,73	C I	16
10830 ,337 10830 ,248 10829 ,088 10827 ,091 10812 ,901 10811 ,085	He I He I He I Si I Ar II Mg I	25000 15000 5000 140 12 35	9361 ,95 9340 ,544 9327 ,545 9326 ,52 9300 ,85	Kr II Mg II Mg II Ne I Ne I	300 10 10 600 600 500
10764 ,378 10749 ,29 10746 ,44 10683 ,050 10638 ,121	Ar II Na I Na I Ar II Ar II	8 9 10 12 8	9293,82 9244,266 9238,48 9224,4955 9218,248 9201,76	Kr II Mg II Kr II Ar I Mg II Ne I	13 500 1000 14 600
10562 ,43 10519 ,510 10470 ,051 10467 ,173 10392 ,51 10343 ,85	Ne I Ar II Ar I Ar II Cl I	200 9 500 20 331	9172,3217 9162,654 9148,68 9122,9660 9094,83	Cs I Xe I Ne I Ar I C I	1000 500 600 500
10321,46 10221,46 10123,6025 10114,644 10112,483	Ca I Kr II Cs I N I N I	500 1000 1200 13	9045 ,446 8987 ,57 8952 ,254 8943 ,483 8930 ,83	Xe I Xe I Xe I Cs I Xe I	400 200 1000 2000 200
10111,595	Ar II	8	8928,6920	Kr I	2000
10108,893	N I	11	8927,36	Ca II	11
10105,130	N I	10	8912,07	Ca II	10
10092,16	Mg Il	14	8908,73	Xe I	200
10065 ,15	N II	7	8900 ,92	F I	1000
10035 ,45	N II	7	8865 ,7562	Ne I	500
10024 ,3595	Cs I	1000	8862 ,32	Xe I	300
10023 ,27	N II	8	8853 ,8669	Ne I	700
9969 ,34	N II	7	8835 ,082	Mg II	11
9967,045	Ar II	12	8824 ,323	Mg II	10
9961,281	Na I	7	8819 ,412	Xe I	5000
9923,192	Xe I	3000	8804 ,61	Xe II	30
9891,09	N II	7	8783 ,7539	Ne I	1000
9890,63	Ca II	11	8780 ,6223	Ne I	1200
9854,065	Ar II	8	8776 ,7490	Kr I	6000
9849,460	Ar II	10	8773 ,896	Al I	14
9803,14	Kr II	500	8772 ,866	Al I	13
9799,699	Xe I	2000	8771 ,855	Ar II	15
9784,5010	Ar I	1000	8761 ,415	Cs I	500
9751 ,759	Kr I	2000	8745 ,657	Mg II	11
9705 ,64	Ti I	80	8739 ,39	Xe I	300
9698 ,68	Xe II	50	8734 ,990	Mg II	10
9675 ,55	Ti I	90	8716 ,19	Xe II	50
9665 ,424	Ne I	1000	8711 ,708	N I	15
9657,7841	Ar I	1500	8692,34	Ti I	100
9638,28	Ti I	100	8688,632	Fe I	1500
9632,435	Mg II	11	8683,400	N I	16
9631,888	Mg II	12	8682,99	Ti I	125
9619,61	Kr II	400	8681,9216	Ne I	500
9605 ,80	Kr II	500	8680 ,270	N I	17
9691 ,35	Xe II	50	8679 ,4898	Ne I	500
9577 ,52	Kr II	500	8675 ,38	Ti I	1 50

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λ, Å	Symbol	I	λ, Å	Symbol	I
8662,140	Ca II	16	8234 ,639	Mg II	11
8661,907	Fe I	600	8231 ,6348	Xe I	10000
8654,3837	Ne I	1500	8230 ,773	F I	3000
8649,922	Na I	7	8216 ,317	N I	15
8640,7	Al II	8	8214 ,726	F I	2500
8634,6472	Ne I	600	8212,00	Cl I	100
8629,238	N I	16	8206,341	Xe I	700
8594,005	N I	15	8201,720	Ca II	10
8585,96	Cl I	100	8194,8237	Na I	9
8556,7803	Si I	120	8190,0543	Kr I	3000
8548,07	Ti I	100	8151,80	Xe II	100
8542,089	Ca II	17	8115,3108	Ar I	5000
8521,4428	Ar I	2000	8112,900	Kr I	6000
8521,149	Cs I	4000	8104,3642	Kr I	4000
8518,37	Ti I	100	8103,6920	Ar I	2000
8508 ,8700	Kr I	3000	8103,448	Si III	11
8500 ,32	C III	10	8092,634	Cu I	2000
8498 ,018	Ca II	13	8079,0332	Cs I	1000
8495 ,3591	Ne I	500	8059,5038	Kr I	1500
8468 ,46	Ti I	100	8046,073	Fe I	600
8446 ,758	O I	29	8040 ,931	F I	1000
8446 ,359	O I	30	8038 ,26	Xe II	100
8446 ,250	O I	27	8031 ,64	Xe II	100
8435 ,68	Ti I	300	8014 ,7853	Ar I	800
8434 ,98	Ti I	300	8008 ,45	Xe II	300
8428,25	Cl I	100	8006 ,1566	Ar I	600
8426,50	Ti I	200	7998 ,972	Fe I	700
8424,6473	Ar I	2500	7988 ,17	Cu II	60
8412,36	Ti I	150	7967 ,341	Xe I	500
8409,190	Xe I	2000	7944 ,0011	Si I	140
8408 ,2094	Ar I	3000	7943,8820	Cs I	800
8396 ,93	Ti I	90	7937,166	Fe I	700
8387 ,780	Fe I	1200	7933,130	Cu I	1500
8382 ,82	Ti I	90	7932,3490	Si I	120
8382 ,54	Ti I	100	7915,419	N I	7
8377,90	Ti I	100	7898,985	N I	.8
8377,6062	Ne I	800	7896,368	Mg II	13
8375,95	Cl I	150	7887,395	Xe I	300
8363,52	Al II	8	7878,22	Cl I	75
8359,57	Al II	9	7877,051	Mg II	12
8354 ,35	Al II	10	7854,8215	Kr I	800
8347 ,24	Xe II	100	7849,72	Si II	500
8346 ,823	Xe I	2000	7848,80	Si II	400
8335 ,15	C I	13	7836,134	Al I	12
8333 ,27	Cl I	5000	7835,309	Al I	11
8332,99	C III	7	7807,66	Cu II	75 15000 26 27 28
8327,063	Fe I	1200	7800,212	F I	
8300,3248	Ne I	600	7775,388	O I	
8298,581	F I	2000	7774,166	O I	
8298,1077	Kr I	5000	7771,943	O I	
8297,55	Xe II	100	7754,696	FI	18000
8283,21	Cu II	60	7744,94	ClI	125
8281,0495	Kr I	1500	7717,57	ClI	100
8280,1163	Xe I	7000	7698,959	KI	24
8274,615	F I	1500	7694,5393	KrI	500
8266 ,519	Xe I	500	7685 ,2460	Kr I	400
8264 ,5221	Ar I	1500	7664 ,899	K I	25
8263 ,2398	Kr I	3000	7664 ,70	Cu II	75
8248 ,797	Ca II	11	7642 ,025	Xe I	500

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λ, Λ	Symbol	I	λ, Α	Symbol	I
7635,1056 7612,356 7608,9032 7601,5443 7587,4130	Ar I Si III Cs I Kr I Kr I	500 12 500 2000 1000	6863,535 6856,030 6834,264 6830	Ar II F I F I O V	20 50000 9000 8
7547,06 7511,045 7503,8685 7468,309 7442,259	Cl I Fe I Ar I N I N I	100 800 700 16 15	6805,74 6773,984 6756,548 6723,2943 6723,12 6717,685	Xe II F I Ar II Cs I N I Ca I	1000 7000 20 500 9 500
7423,635 7423,4969 7415,9462 7414,10 7407,02	N I Si I Si I Cl I Kr II	14 425 275 90 400	6707,84 6698,673 6696,023 6684,307 6678,151	Li I Al I Al I Ar II He I	1000 11 13 50
7405 ,774 7404 ,34 7398 ,688 7326 ,146 7320 ,70 7311 ,019	Si I Cu II F I Ca I Fe II F I	374 100 10000 400 40 15000	6677, 994 6651, 75 6643, 716 6639, 743 6638, 226	Fe I Kr III Ar II Ar II Ar 1I	600 10 100 30 50
7311,619 7307,957 7289,78 7289,1730 7279,9570 7256,63	Fe II Kr II Si I Cs I Cl I	50 400 400 500 125	6610 ,565 6602 ,90 6598 ,9529 6595 ,01 6586 ,5096	N II Kr III Ne I Xe II Cs I	13 10 1000 800 500
7254,529 7254,447 7254,154 7245,1665 7236,42	O I O I O I Ne I C II	17 20 19 1000 20	6582 ,88 6578 ,05 6562 ,793 6561 ,032 6560 ,435	C II C II H D	15 18 3000 3000 3000
7231,32 7228,5256 7207,406 7202,360 7202,194	C II Cs I Fe I F I Ca I	18 500 500 15000 200	6560,099 6545,973 6494,985 6484,88 6483,076	He II Mg II Fe I N I Ar II	100 11 1000 9 20
7187,341 7173,9380 7164,83 7148,147 7127,890	Fe I Ne I Xe II Ca I F I	800 1000 800 500 30000	6482,74 6482,053 6469,705 6462,566 6456,376	N I N II Xe I Ca I Fe II	9 13 300 125 200
7119,598 7115,19 7113,18 7065,190	Xe I C I C I IIe I	500 500 9 9 2500	6455,975 6454,445 6453,602 6439,073 6413,651	O I O I O I Ca I F I	19 18 17 150 8000
7037,469 7032,4128 7002,228 7001,915	FI NeI OI OI	45000 1000 17 15	6402,2460 6400,013 6382,9914 6380,77 6371,359	Ne I Fe I Ne I N IV Si II	2000 2000 800 1000 8 1000
6990 ,88 6973 ,2966 6942 ,11 6938 ,767 6929 ,4672	Xe II Cs I Xe II K I Ne I	2000 500 1000 20 1000	6356 ,35 6348 ,508 6347 ,103 6346 ,737	Xe II F I Si II Mg II	500 10000 1000 10
6911,084 6902,475 6886,618 6882,155 6870,215	K I F I Ar II Xe I F I	19 15000 20 300 8000	6334,4279 6318,062 6310,22 6273,330 6266,4950	Ne I Xe I Kr III Cu II Ne I	1000 500 10 60 1000

λ, Å	Symbol	I	λ, Å	Symbol	1
6247,562	Fe II	80	5801,33	C IV	10
6243,125	Ar II	25	5782,384	K I	16
6239,651	F I	13000	5782,132	Cu I	1500
6238,24	Xe III	60	5764,4188	Ne I	700
6221,66	Xe III	25	5739,733	Si III	20
6217,2813	Ne I	1000	5722 ,65	Al III	6
6216,910	Cu II	60	5711 ,0880	Mg I	30
6201,70	Al II	9	5710 ,766	N II	10
6201,52	Al II	10	5700 ,240	Cu I	1500
6183,42	Al II	10	5696 ,47	Al III	8
6182,420	Xe I	300	5695,92	C III	12
6182,28	Al II	8	5688,2046	Na I	9
6172,290	Ar II	40	5686,213	N II	10
6163,5939	Ne I	1000	5681,89	Kr II	400
6162,172	Ca I	150	5679,562	N II	14
6158 ,183	O I	21	5676,019	N II	11
6156 ,765	O I	20	5669,562	Si II	1000
6155 ,975	O I	19	5666,627	N II	12
6147 ,735	Fe II	30	5650,7054	Ar I	1500
6143 ,0623	Ne I	1000	5594,468	Ca I	60
6122,219	Ca I	100	5593 ,23	Al II	10
6114,929	Ar II	50	5592 ,37	O III	6
6103,64	Li I	500	5588 ,757	Ca I	80
6097,59	Xe II	1000	5570 ,2890	Kr I	2000
6094,65	Cl II	100	5564 ,37	N I	9
6078,38	Kr III	10	5563,019	Cs II	125
6074,3377	Ne, I	1000	5562,2254	Kr I	500
6051,15	Xe II	1000	5560,37	N I	9
6037,17	Kr III	10	5557,063	Al I	10
6036,20	Xe II	500	5528,4047	Mg I	40
6029,9971	Ne I	1000	5524 ,39	Xe III	40
6014,85	C I	9	5501 ,43	Kr III	10
6013,22	C I	10	5495 ,876	Ar I	1000
6008,48	N I	10	5484 ,7	Li II	10
6006,03	C I	9	5466 ,868	Si II	500
5978 ,929	Si II	500	5466 ,432	Si II	500
5976 ,46	Xe II	1000	5443 ,42	Cl II	100
5975 ,5340	Ne I	600	5427 ,832	Fe II	30
5962 ,4	Fe II	30	5423 ,52	Cl II	100
5957 ,561	Si II	500	5423 ,25	Cl II	150
5941,653	N II	12	5419 ,687	Cs II	60
5931,779	N II	11	5419 ,15	Xe II	2000
5929,69	Fe III	18	5411 ,524	He II	50
5925,651	Cs II	60	5401 ,04	Xe III	50
5895,9236	Na I	16	5400 ,5616	Ne I	2000
5891,59	C II	12	5392 ,12	Cl II	100
5889,9504	Na I	32	5380 ,34	C I	10
5889,77	C II	15	5370 ,979	Cs II	80
5881,8950	Ne I	1000	5367 ,06	Xe III	30
5875,966	He I	1000	5358 ,53	Cs II	500
5875,621	He I	7500	5343 ,2834	Ne I	600
5870,9153	Kr I	3000	5341 ,0938	Ne I	1000
5857,454	Ca I	100	5339 ,38	Xe II	1000
5852,4878	Ne I	2000	5333 ,41	Kr II	500
5831,887	K I	17	5330 ,7775	Ne I	600
5831 ,159	Cs II	60	5316,07	Al II	7
5823 ,890	Xe I	300	5313,87	Xe II	800
5811 ,98	C IV	9	5305,3	O IV	15
5801 ,752	K I	17	5292,517	Cu I	1650

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λ, Å	Symbol	I	λ, Å	Symbol	I
5292 ,22	Xe II	1000	4923 ,1522	Xe I	500
5283 ,77	Al II	8	4921 ,48	Xe II	800
5270 ,270	Ca I	60	4917 ,72	Cl II	125
5268 ,06	O III	2	4916 ,508	Xe I	500
5249 ,373	Cs II	80	4909 ,726	Cu II	100
5238,95	Xe III	60	4904 ,76	Cl II	135
5227,002	Cs II	200	4896 ,77	Cl II	200
5218,202	Cu I	2500	4884 ,9170	Ne I	1000
5217,93	Cl II	150	4883 ,53	Xe II	600
5208,32	Kr II	500	4879 ,860	Ar II	30
5202,413	Si II	500	4876,50	Xe II	500
5187,7507	Ar I	800	4869,47	Xe III	40
5183,6042	Mg I	45	4862,54	Xe II	800
5172,6843	Mg I	44	4861,332	H	500
5167,3216	Mg I	42	4860,029	D	500
5163,90	Al III	$7 \\ 2000 \\ 13 \\ 6 \\ 25$	4859,595	T	500
5153,235	Cu I		4847,815	Ar II	25
5151,09	C II		4846,60	Kr II	700
5150,86	Al III		4844,33	Xe II	2000
5145,319	Ar II		4843,294	Xe I	300
5145,16	C II	15	4832,07	Kr II	800
5143,49	C II	12	4829,709	Xe I	400
5141,790	Ar II	20	4829,23	K II	9
5136,795	Fe II	35	4828,968	Si III	18
5133,28	C II	12	4827,3444	Ne I	1000
5132,94	C II	12	4819,46	Cl II	200
5125,73	Kr II	400	4810,06	Cl II	225
5105,541	Cu I	1500	4807,019	Xe I	500
5103,04	Cl II	125	4806,017	Ar II	35
5099,30	Cl II	100	4799,2	O IV	10
5080,62	Xe II	600	4798 ,25	O IV	5
5078,25	Cl II	125	4794 ,54	Cl II	250
5062,036	Ar II	30	4788 ,9270	Ne I	1000
5056,27	K II	7	4788 ,8	Li II	8
5055,981	Si II	1000	4786 ,4	O IV	20
5052,47	C I	8	4783 ,43	O IV	4
5051,778	Cu II	60	4771 ,75	C I	8
5043,800	Cs II	80	4768 ,68	Cl II	150
5041,026	Si II	1000	4765 ,74	Kr II	1000
5037,8	Li II	6	4764 ,862	Ar II	25
5017,160	Ar II	20	4740 ,40	Cl II	150
5016,45	Kr III	20	4739 ,00	Kr II	3000
5010,620	N II	10	4735 ,905	Ar II	25
5009,334	Ar II	30	4734 ,1524	Xe I	600
5007,325	N II	11	4726 ,859	Ar II	25
5005,60	K II	8	4723 ,57	Xe III	30
5005,149	N II	14	4715 ,3466	Ne I	1500
5001,477	N II	12	4712 ,066	Ne I	1000
5001,136	N II	11	4710 ,48	Kr III	10
4994,363	N II	10	4710 ,0669	Ne I	10
4988,52	Kr III	10	4708,8619	Ne I	1200
4981,732	Ti I	60	4705,355	O II	8
4965,073	Ar II	25	4704,3949	Ne I	1500
4957,0335	Ne I	1000	4702,9909	Mg I	30
4944,56	N V	9	4702,3155	Ar I	1200
4935,03	N I	10	4701,65	Al III	6
4933 ,206	Ar II	25	4697,020	Xe I	300
4932 ,05	C I	8	4685,682	He II	300
4931 ,653	Cu II	100	4683,53	Xe III	60

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λ, Å	Symbol	I	λ, Å	Symbol	I
4680 ,41 4677 ,7 4676 ,234 4673 ,66 4671 ,226	Kr II Li II O II Xe III Xe I	500 8 8 30 2000	4537 ,7545 4537 ,33 4536 ,46 4534 ,782 4533 ,238	Ne I Xe III Kr III Ti I Ti I	1000 30 10 60 80
4666 ,8 4663 ,054 4661 ,635 4658 ,87 4658 ,30	Al II Al II O II Kr II C IV	11 10 9 2000 9	4529 ,176 4526 ,20 4524 ,6805 4523 ,33 4523 ,14	Al III Cl I Xe I Cl III Kr II	6 30 400 4 400
4657,893 4654,323 4651,47 4651,124 4650,25	Ar II Si IV C III Cu I C III	25 10 11 2000 13	4522 ,3238 4514 ,89 4510 ,7335 4505 ,33 4502 ,3546	Ar I N III Ar I K II Kr I	800 7 1000 6 600
4649,139 4647,42 4643,085 4641,90 4641,811	O II N II N III O II	10 14 11 7 9	4500 ,9772 4497 ,658 4494 ,177 4489 ,88 4481 ,327	Xe I Na I Na I Kr II Mg II	500 11 10 400 13
4640 ,64 4634 ,16 4633 ,88 4631 ,241 4630 ,543	N III N III Kr II Si IV N II Ar I	10 8 800 9 14 1000	4481 ,130 4480 ,86 4475 ,00 4471 ,479 4463 ,6901	Mg II Xe II Kr II He I Kr I	14 500 800 1000 800
4628,4409 4624,2757 4621,394 4619,98 4619,15 4615,28	Xe I N II N V Kr II Kr II	1000 10 10 1000 500	4462 ,19 4454 ,781 4453 ,9177 4448 ,13 4447 ,18	Xe II Ca I Kr I Xe II F II	1000 80 600 500 12
4609,560 4608,45 4608,21 4607,157 4603,755	Ar II K II Cl III N II Cs II	25 8 5 10 60	4447 ,033 4446 ,71 4443 ,28 4438 ,48 4436 ,81	N II F II Kr III Cl I Kr II	12 10 15 20 600
4603,73 4603,03 4602,86 4601,480 4601,00 4596,22	N V Xe II Li I N II Cl I Cl III	$egin{array}{c} 12 \\ 600 \\ 100 \\ 11 \\ 20 \\ 4 \\ \end{array}$	4434 ,960 4434 ,16 4431 ,67 4430 ,192 4428 ,54	Ca I Xe III Kr II Ar II Ne II	60 50 500 20 6
4596 ,174 4596 ,0964 4593 ,172 4591 ,10 4590 ,971	O II Ar I Cs I Cl III O II	8 1000 1000 4 9	4426 ,005 4423 ,246 4416 ,972 4414 ,909 4409 ,30	Ar II Na I O II O II Ne II	25 7 8 10 7
4589 ,896 4585 ,48 4582 ,7474 4579 ,346 4577 ,20	Ar II Xe II Xe I Ar II Kr II	25 500, 300 25 800	4400,988 4397,94 4395,77 4395,031 4393,340	Ar II Ne II Xe II Ti II Na I	20 6 500 60 9
4574,759 4572,13 4567,823 4555,280 4552,616	Si III Cl II Si III Cs I Si III Ti II	20 100 25 2000 30 60	4393, 20 4391, 94 4390, 564 4390, 029 4389, 76 4388, 16	Xe II Ne II Mg II Na I Cl I K II	500 7 10 8 25 7
4549 ,622 4545 ,186 4545 ,045 4541 ,633	Na I Ar II Na I	8 25 7	4379 ,90 4379 ,667 4379 ,50	Cl I Ar II Ne II	20 20 6

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λ, Α	Symbol	I	λ, Λ	Symbol	I	_
4379,09	N III	10	4219,76	Ne II	6	
4372,81	Fe III	20	4212,407	Si IV	7	
4371,329	Ar II	20	4200,6746	Ar I	1200	
4370,91	Cl III	4	4198,3176	Ar I	1200	
4363,30	Cl I	20	4193,15	Xe II	500	
4363 ,275	Cs II	50	4191,0288	Ar I	1200	
4362 ,6424	Kr I	500	4190,7138	Ar I	600	
4355 ,47	Kr II	3000	4189,788	O II	10	
4349 ,426	O II	8	4186,900	C III	9	
4348 ,063	Ar II	50	4186,24	K II	8	
4345 ,167	Ar I	1000	4185,456	O II	8	
4343 ,62	Cl II	100	4181,8837	Ar I	1000	
4340 ,468	H	200	4180,10	Xe II	1000	
4339 ,287	D	200	4171,79	Kr III	15	
4338 ,893	T	200	4164,73	Fe III	20	
4335,3381	Ar I	800	4164 ,1795	Ar I	1000	
4333,5612	Ar I	1000	4158 ,8	O V	0	
4331,199	Ar II	25	4158 ,5906	Ar I	1200	
4330,52	Xe II	1000	4154 ,46	Kr III	40	
4325,560	C III	8	4151 ,46	N I	12	
4324,615	Na I	7	4149 ,19	K II	7	
4323,35	Cl I	20	4145 ,73	Xe III	100	
4319,631	O II	8	4134 ,72	K II	7	
4319,5798	Kr I	1000	4132 ,48	Cl II	200	
4318,5523	Kr I	400	4131 ,33	Kr III	40	
4317,81	Kr II	500	4130 ,893	Si II	500	
4317,139	O II	8	4123 ,9	O V	2	
4310,51	Xe II	500	4119 ,221	O II	8	
4309,10	K II	7	4116 ,097	Si IV	9	
4305,910	Ti I	60	4114 ,99	K II	6	
4305,00	K II	7	4109,959	N I	12	
4300,1011	Ar I	1200	4109,07	Xe III	100	
4300,052	Ti II	60	4103,913	Ar II	20	
4299,177	F II	10	4103,525	F II	15	
4296,40	Xe II	500	4103,37	N III	9	
4294 ,83	Kr III	10	4103,085	F II	10	
4292 ,92	Kr II	600	4101,737	H	100	
4290 ,40	Ne II	6	4100,621	D	100	
4285 ,89	Xe III	30	4100,249	T	100	
4277 ,524	Ar II	20	4099,951	N I	9	
4277,100	Cs II	50	4097,31	N III	10	
4273,9700	Kr I	1000	4088,854	Si IV	10	
4272,1690	Ar I	1200	4088,33	Kr II	500	
4267,258	C II	20	4075,868	O II	10	
4267,003	C II	18	4072,164	O II	8	
4266 ,528	Ar II	25	4072,006	Ar II	25	
4266 ,2868	Ar I	1200	4070,261	C III	9	
4263 ,40	K II	7	4068,912	C III	9	
4259 ,3617	Ar I	1200	4067,940	C III	8	
4251 ,1850	Ar I	800	4067,37	Kr III	50	
4246 ,16 4245 ,38 4238 ,25 4228 ,162 4226 ,728	F II Xe II Xe II Ar II Ca I	15 500 500 20 500	4065 ,11 4062 ,641 4060 ,43 4059 ,07	Kr II Cu I Xe III Cl III	300 2000 60 6	
4226 ,58	Kr III	25	4057,01	Kr II	300	
4225 ,92	Kr III	20	4050,05	Xe III	200	
4225 ,67	K II	7	4047,206	K I	17	
4222 ,97	K II	7	4044,4185	Ar I	1200	

λ, λ	Symbol	I	λ, Α	Symbol	I
4044 ,136 4043 ,502 4041 ,311 4025 ,495 4025 ,010	K I Cu II N II F II F II	18 75 11 15	3860 ,80 3859 ,9132 3856 ,017 3851 ,667 3850 ,97	Cl II Fe I Si II F II Cl II	150 300 500 10 100
4024 ,727	FII	20	3850 ,578	Ar II	30
4018 ,50	ClIIII	6	3849 ,987	F II	15
4013 ,858	ArII	25	3847 ,086	F II	20
4001 ,24	KII	7	3843 ,26	Cl II	100
3998 ,635	TiI	100	3841 ,52	Xe III	100
3994 ,998	N II	15	3838 ,374	N II	8
3989 ,758	Ti I	80	3838 ,293	Mg I	40
3981 ,761	Ti I	70	3837 ,81	Kr I	30
3973 ,263	O II	10	3834 ,6788	Ar I	800
3972 ,58	K II	6	3834 ,24	O VI	1
3968 ,468	Ca II	$ \begin{array}{r} 22 \\ 20 \\ 6 \\ 25 \\ 8 \end{array} $	3833,40	Cl II	200
3968 ,360	Ar II		3832,302	Mg I	38
3966 ,72	K II		3830,39	N I	9
3965 ,187	Cs II		3829,355	Mg I	36
3961 ,59	O III		3827,62	Cl II	150
3961 ,5200	Al l	26	3825 ,8834	Fe I	200
3959 ,495	Cs II	20	3823 ,469	O I	10
3958 ,206	Ti I	80	3822 ,07	N I	6
3956 ,336	Ti I	60	3820 ,4274	Fe I	250
3955 ,851	N II	10	3820 ,25	Cl II	100
3954 ,387	() I	10	3812,2155	Kr I	20
3950 ,56	Xe III	300	3811,35	O VI	2
3948 ,9785	Ar I	2000	3806,544	Si III	30
3948 ,670	Ti I	60	3805,096	Cs II	25
3947 ,5048	Ar I	1000	3800,5437	Kr I	30
3947 ,489	O I	7	3796 ,8839	Kr I	20
3947 ,301	O I	10	3796 ,114	Si III	25
3944 ,0058	Al I	24	3795 ,37	Ar III	20
3933 ,663	Ca II	23	3791 ,41	Si III	20
3928 ,629	Ar II	25	3785 ,424	Cs II	20
3925 ,583	Cs II	25	3783 ,19	K II	6
3924 ,468	Si III	20	3783 ,13	Kr II	500
3922 ,53	Xe III	500	3780 ,98	Xe III	300
3920 ,693	C II	18	3780 ,841	Ar II	25
3920 ,14	Kr II	200	3778 ,09	Kr II	500
3918,999	N II	9	3777,16	Ne II	8
3918,978	C II	15	3773,4241	Kr I	50
3913,464	Ti II	60	3771,08	N III	7
3911,960	O II	10	3770,3698	Ar I	400
3907,91	Xe II	100	3767,36	K II	6
3906 ,933	Cs II	20	3766 ,29	Ne II	8
3906 ,25	Kr II	150	3765 ,269	Ar II	20
3900 ,68	Al II	10	3762 ,435	Si IV	8
3900 ,546	Ti II	70	3761 ,320	Ti II	200
3897 ,92	K II	8	3759 ,87	O III	9
3888 ,648	He I	5000	3759 ,291	Ti II	200
3888 ,610	Cs I	150	3754 ,67	O III	7
3880 ,46	Xe III	60	3754 ,62	N III	6
3878 ,5745	Fe I	100	3752 ,860	Ti I	80
3877 ,80	Xe III	200	3749 ,49	O II	9
3876 ,146	Cs I	300	3749 ,4875	Fe I	200
3875 ,44	Kr II	150	3748 ,81	Cl III	8
3868 ,524	Ar II	20	3744 ,80	Kr II	150
3860 ,98	Cl II	100	3741 ,69	Kr II	200

λ, Å	Symbol	I	λ, Å	Symbol	I
3741,059	Ti I	60	3572,2960	Ar I	300
3737,1333	Fe I	150	3567,6562	Ar I	300
3736,901	Ca II	18	3564,23	Kr III	100
3734,94	Ne II	7	3561,031	Ar II	20
3734,8659	Fe I	300	3560,68	Cl III	8
3729 ,310	Ar II	30	3559 ,508	Ar II	25
3727 ,33	O II	8	3554 ,3056	Ar I	300
3727 ,08	Ne II	9	3545 ,842	Ar II	18
3721 ,35	Kr II	150	3545 ,597	Ar II	18
3720 ,45	Cl III	8	3542 ,90	Ne II	7
3719 ,9367	Fe I	$250 \\ 200 \\ 300 \\ 10 \\ 7$	3537,75	Ca III	7
3718 ,63	Kr II		3535,319	Ar II	18
3718 ,02	Kr II		3533,043	Na II	10
3713 ,084	Ne II		3530,75	K II	7
3712 ,75	O II		3530,383	Cu I	2000
3709 ,64	Ne II	7	3530,03	Cl III	9
3706 ,026	Ca II	17	3522,83	Xe III	80
3694 ,197	Ne II	10	3520,4714	Ne I	1000
3692 ,44	O I	7	3514,388	Ar II	20
3690 ,8960	Ar I	300	3507,42	Kr III	200
3685 ,192 3681 ,54 3680 ,37 3679 ,58 3675 ,2367	Ti II K II Kr II Kr I Ar I	250 6 100 100 300	3505,614 3504,890 3503,58 3503,095 3502,5537	F II Ti II Ar III F II Kr I F II	15 80 15 12 20 10
3665 ,3259 3664 ,112 3655 ,00 3653 ,97 3653 ,497	Kr I Ne II Al II Kr II Ti I	80 9 8 250 100	3501,416 3491,538 3491,243 3488,59 3484,96 3482,99	Ar II Ar II Kr III N IV N IV	$ \begin{array}{r} 10 \\ 25 \\ 20 \\ 100 \\ 13 \\ 14 \end{array} $
3649 ,8330	Ar I	800	3480,55	Ar III	20
3642 ,675	Ti I	80	3478,71	N IV	15
3641 ,330	Ti II	100	3476,814	Cs I	100
3635 ,462	Ti I	80	3476,749	Ar II	20
3634 ,4605	Ar I	300	3472,5706	Ne I	500
3632 ,6837	Ar I	300	3470 ,81	O II	8
3631 ,87	Kr II	200	3461 ,26	Xe II	100
3631 ,266	Na II	8	3461 ,0785	Ar I	300
3624 ,826	Ti II	70	3444 ,23	Xe III	60
3624 ,05	Xe III	600	3440 ,6069	Fe I	150
3618,49	K II	6	3439 ,46	Kr III	100
3615,4755	Kr I	20	3437 ,147	N II	9
3612,85	Cl III	8	3431 ,7217	Kr I	20
3611,459	Cs I	200	3424 ,9433	Kr I	15
3607,88	Kr II	100	3417 ,9031	Ne I	500
3606,5224	Ar I	1000	3407 ,38	O II	7
3602,40	Cl III	9	3393 ,45	Cl III	8
3601,623	Al III	6	3392 ,89	Cl III	8
3593,5263	Ne I	500	3391 ,85	Ar III	15
3590,465	Si III	20	3390 ,25	O II	8
3588,448	Ar II	30	3383 ,761	Ti II	125
3587,057	Al II	8	3377 ,20	O II	7
3586,546	Al II	9	3374 ,06	N III	6
3583,64	Xe III	80	3373 ,4823	Ar I	300
3582,362	Ar II	20	3372 ,800	Ti II	100
3581,608	Ar II	18	3372 ,68	Ca III	8
3581,195	Fe I	250	3371 ,447	Ti I	80
3579,69	Xe III	100	3369 ,9069	Ne I	700
3576,611	Ar II	25	3369 ,8076	Ne I	500

λ, Å	Symbol	I	λ, Å	Symbol	I
3368 ,555	Cs II	30	3233,954	Si III	14
3367 ,36	N III	7	3232,66	Li I	50
3366 ,72	Xe II	300	3224,99	Kr IV	6
3361 ,213	Ti II	125	3218,21	Ne II	8
3358 ,49	Ar III	15	3210,534	Si III	15
3355,05	Ne II	7	3203,104	He II	200
3354,634	Ti I	60	3202,740	F II	10
3353,39	Cl II	125	3199,915	Ti I	100
3351,93	Kr III	100	3199,43	Li II	7
3349,399	Ti II	125	3196,504	Si III	14
3349 ,035	Ti II	75	3191,994	Ti I	80
3344 ,72	Ar III	20	3191,45	Cl III	9
3341 ,875	Ti II	100	3191,21	Kr III	80
3340 ,42	Cl III	9	3189,11	Kr III	100
3339 ,819	Si II	500	3187,745	He I	200
3336 ,13	Ar III	25	3186 ,451	Ti I	60
3334 ,87	Ne II	10	3186 ,022	Si III	13
3333 ,139	Si II	300	3185 ,125	Si III	16
3329 ,455	Ti II	70	3181 ,275	Ca II	15
3329 ,12	Cl II	150	3179 ,332	Ca II	18
3329 ,06	Cl III	8	3174 ,725	F III	10
3328 ,730	N II	7	3174,125	F III	12
3325 ,75	Kr III	200	3169 ,667	Ar II	15
3323 ,75	Ne II	7	3165 ,710	Si IV	9
3322 ,936	Ti II	75	3158 ,869	Ca II	17
3319 ,3446	Ar I	300	3153,492	F II	6
3315 ,44	Cl II	100	3149,561	Si IV	7
3311 ,25	Ar III	15	3139,34	Cl III	8
3307 ,948	Cu I	2500	3138,44	O II	8
3302 ,979	Na I	18	3134,82	O II	10
3302,369	Na I	19	3129,368	Na II	6
3301,88	Ar III	20	3124,39	Kr III	100
3297,74	Ne II	7	3121,87	Xe II	250
3288,81	Fe III	15	3121,515	F III	12
3285,85	Ar III	25	3120,847	Fe III	20
3285,603	Na II	8	3119,66	Ca III	8
3279,815	Cu I	2000	3115,669	F III	10
3276,08	Fe III	15	3104,40	Xe II	70
3273,957	Cu I	10000	3096,826	Si III	16
3271,626	Cs II	20	3093,424	Si III	20
3268,96	Xe III	80	3092 ,8386	Al I	20
3268,48	Kr III	100	3092 ,729	Na II	10
3267,135	Cs II	30	3092 ,7099	Al I	26
3266,88	Fe III	20	3091 ,06	Xe III	50
3265,924	Cs II	30	3088 ,027	Ti II	75
3265,46	O III	10	3086 ,236	Si III	25
3264,81	Kr III	150	3082 ,1529	Al I	24
3264,164	F III	9	3076 ,68	Cl IV	6
3264,16	F II	7	3071 ,66	O IV	5
3260,98	O III	8	3063 ,46	O IV	6
3249,801 3249,8 3247,540 3245,69 3243,689 3242,689	Ar II Li II Cu I Kr III Ar II Xe III	15 5 10000 300 14 100	3063,411 3063,13 3059,960 3058,141 3057,388 3057,083 3053,664	Cu I Cl IV F II F II Ne I F II Na II	2500 5 8 7 300 6 6
3241 ,622 3236 ,573 3234 ,517	Si III Ti II Ti II	15 70 75	3047 ,13 3042 ,808	O III F III	8 10

λ, Δ	Symbol	I	λ, Α΄	Symbol	I
3036 ,101	Cu I	2500	2881 ,140	Na II	6
3024 ,45	Kr III	80	2869 ,95	Ca III	7
3023 ,80	Xe III	100	2868 ,52	Al II	9
3021 ,0743	Fe I	150	2866 ,57	Ca III	7
3020 ,6405	Fe I	200	2864 ,73	Xe II	150
3020 ,4918 3017 ,43 3013 ,167 3010 ,838 3007 ,275 3006 ,830	Fe I Xe II Fe III Cu I Fe III N II	150 100 20 2000 20 7	2862,26 2860,308 2854,53 2853,013 2852,811	N III F III Xe II Na I Na I	6 9 60 15 16
2997,364 2992,618 2988,61 2984,183 2983,78 2983,58	Cu I Cu I Ca III Ca III Na II O III N III	2000 18 7 7 9 6	2852,127 2841,721 2837,603 2836,710 2836,25 2833,00	Mg I Na II C II C II O IV Kr II	50 7 18 20 6
2983,5714 2982,663 2982,106 2981,31 2980,78 2979,32	Fe I Ne I C JII N V N V Xe II	125 300 8 10 8 300	2826 ,13 2820 ,74 2816 ,943 2816 ,179 2813 ,88	F IV F IV Cs II Al II Ca III	5 4 20 20 7
2979,051	Ar II	$ \begin{array}{c} 15 \\ 300 \\ 5 \\ 2500 \\ 70 \end{array} $	2811 ,422	F III	10
2974,714	Ne I		2809 ,44	Ar IV	16
2967,244	C I		2802 ,704	Mg II	12
2961,165	Cu I		2797 ,998	Mg II	10
2956,18	Ti I		2795 ,528	Mg II	13
2955 ,73	Ne II	7	2789,86	O V	3
2951 ,231	Na II	8	2788,96	Ar IV	14
2948 ,38	Ti I	60	2788,093	F III	20
2948 ,06	Xe III	40	2787,03	O V	4
2947 ,53	Xe III	40	2784,47	Ar IV	12
2945 ,25	Xe III	60	2782,47	Cl IV	7
2945 ,106	He I	100	2781,04	O V	5
2942 ,892	Ar II	20	2774,70	Kr IV	6
2941 ,963	Ti I	60	2767,0	Li II	4
2940 ,953	Cs II	20	2766,371	Cu I	2500
2940 ,22 2936 ,509 2931 ,09 2926 ,33 2924 ,33	Xe III Mg II Cs II Ar IV Ca III	40 10 20 11 8	2762 ,815 2759 ,589 2757 ,92 2751 ,23 2748 ,18	Al III F III Ar IV Cl IV Kr IV	9 10 14 5
2916,335 2913,00 2907,18 2907,05 2906,56	F III Ar IV Xe II Al III Xe III	10 12 80 10 50	2741,20 2733,32 2730,7 2725,90 2725,30	Li I He II Li II C III C III	10 100 5 7
2906 ,29	C IV	5	2724 ,85	C III	6
2905 ,692	Si II	500	2724 ,03	Cl III	5
2904 ,914	Na II	7	2710 ,37	Cl III	7
2904 ,283	Si II	300	2707 ,17	F V	2
2899 ,78	Ca III	9	2697 ,75	C III	7
2895 ,22	Xe II	150	2688,04	Cl II	150
2893 ,946	Na II	6	2687,78	Ca III	8
2892 ,18	Kr III	100	2686,14	O III	10
2891 ,612	Ar II	18	2678,64	Ne III	25
2884 ,196	Cu II	60	2677,90	Ne III	30
2884 ,099	Ti II	70	2676 ,95	Cl II	100
2881 ,80	Ca III	7	2675 ,64	Ne I	200
2881 ,5792	Si I	1000	2675 ,24	Ne I	200

λ, Å	Symbol	I	λ, Â	Symbol	1
2296,64	Na III	25	2163,77	Ne III	15
2295,859	Fe III	15	2162,944	C III	9
2293,842	Cu I	2500	2151,776	Fe III	15
2293,32	O II	6	2148,974	Cu II	60
2291,26	Kr IV	6	2135,976	Cu II	75
2285,79	Ne IV	9	2133,87	Ar III	15
2285,72	Na III	35	2097,480	Fe III	15
2283,93	Ci III	7	2095,54	Ne III	20
2278,48	Na III	40	2093,683	Fe II	35
2273,83	Cs II	20	2092,64	Mg III	4
2267,61	Cs II	$\begin{array}{c} 20 \\ 6 \\ 3 \\ 12 \\ 2200 \end{array}$	2092,44	Ne III	12
2265,71	Ne V		2089,43	Ne III	15
2263,39	Ne V		2084,117	Fe I	50
2263,21	Ne III		2078,989	Fe III	14
2263,079	Cu I		2068,16	Ti IV	15
2259 ,57	Ne V	$\begin{bmatrix} 3 \\ 50 \\ 3 \\ 7 \\ 2 \end{bmatrix}$	2065,54	Mg III	5
2255 ,691	Fe II		2063,99	N III	10
2253 ,22	Ne VI		2063,50	N III	10
2253 ,07	Cl III		2055,93	Ne VI	3
2252 ,72	F V		2054,969	Cu II	50
2251 ,831	Fe II	80	2043, 791	Cu II	60
2251 ,44	Na III	45	2042, 382	Ne VI	3
2249 ,063	Fe II	30	2011, 88	Na III	30
2247 ,692	Fe II	35	2005, 98	Na III	6
2246 ,995	Cu II	75	2000, 368	Fe II	30
2246,66	Na III	40	1994,073	Fe III	13
2245,505	Fe II	45	1992,060	Ne VII	3
2245,48	Ne V	3	1987,503	Fe III	15
2244,265	Cu I	2300	1985,58	Na III	30
2239,43	Na III	45	1981,974	Ne VII	6
2232 ,41	Ne V	4	1965 ,04	Na III	18
2232 ,17	Na III	40	1960 ,76	Na III	20
2230 ,30	Na III	50	1960 ,318	Fe III	13
2230 ,084	Cu I	2500	1953 ,322	Fe III	13
2228 ,761	Fe II	30	1951 ,21	Na III	40
2227,42	Ne V	3	1946 ,43	Na III	20
2225,90	Na III	45	1943 ,481	Fe III	14
2225,697	Cu I	2100	1938 ,827	Ne II	8
2218,289	Fe II	30	1937 ,345	Fe III	14
2216,07	Ne III	15	1935 ,83	Al III	10
2214,581	Cu I	1600	1933,87	Na III	30
2213,76	Ne III	12	1931,507	Fe III	14
2210,259	Cu II	60	1930,930	C I	10
2208,419	Fe II	30	1930,387	Fe III	15
2202,78	Na III	40	1930,033	Ne II	8
2199,752	Cu I	1300	1926,304	Fe III	18
2199,583	Cu I	1700	1926,27	Na III	45
2192,268	Cu II	75	1922,789	Fe III	15
2192,06	Ar III	15	1916,081	Ne II	10
2181,720	Cu I	1700	1915,083	Fe III	15
2179,399	Cu II	60	1914 ,056	Fe III	19
2178,944	Cu I	1600	1907 ,494	Ne II	8
2177,22	Ar III	25	1901 ,331	Si I	1000
2174,658	Fe III	15	1895 ,456	Fe III	20
2171,44	F IV	4	1890 ,669	Fe III	13
2170,23 2166,773 2166,19 2165,093	Ar III Fe I Ar III Cu I	20 100 15 1300	1889 ,029 1874 ,838 1873 ,140 1862 ,899	Ar II Si I Ar II Al III	500 6 10

λ, Å.	Symbol	I	λ, Å	Symbol	I
1862 ,34	Al II	15	1647,05	Fe IV	45
1858 ,05	Al II	10	1642,208	Cu III	2000
1856 ,73	Na III	20	1640,474	He II	10
1854 ,67	Al III	10	1640,332	He II	5
1850 ,668	Si I	500	1640,03	Fe IV	65
1850 ,39	Na III	18	1639 ,403	Fe II	30
1850 ,24	Na III	20	1636 ,334	Fe II	30
1849 ,58	Na III	35	1635 ,389	Fe II	35
1847 ,468	Si I	400	1631 ,124	Fe II	30
1845 ,510	Si I	300	1630 ,99	Fe IV	75
1844,4	N II	10	1629 ,155	Fe II	30
1844,36	Na III	20	1621 ,685	Fe II	30
1840,061	Ca II	8	1621 ,426	Cu II	60
1838,008	Ca II	7	1611 ,90	Al III	8
1828,61	Al II	10	1608 ,446	Fe II	35
1827,97	Mg I	8	1605,70	Al III	8
1825,348	Cu I	100	1600,694	Ar II	6
1822,50	Cl III	6	1600,194	Cu III	500
1816,921	Si II	200	1593,738	Cu III	1 000
1814,068	Si I	500	1593,556	Cu II	60
1808,003	Si II	150	1574,992	Ar II	6
1787,997	Fe II	35	1561,40	C I	20
1786,738	Fe II	40	1560,702	C I	15
1785,262	Fe II	40	1550,771	C IV	19
1774,820	Cu I	200	1548,185	C IV	20
1769 ,140	Al I	4	1543,438	Cu III	500
1766 ,385	Al I	4	1541,703	Cu II	75
1765 ,636	Al I	4	1539,74	Al II	10
1764 ,01	Al II	10	1533,445	Si II	1000
1756 ,0	Li II	5	1526,719	Si II	500
1753,474	Mg II	60	1519 ,837	Cu II	60
1750,664	Mg II	50	1498 ,65	Ti III	30
1750,391	Cu III	500	1494 ,668	N I	60
1749,02	Mg III	5	1493 ,7	Li II	6
1747,81	Mg I	5	1492 ,817	N I	30
1741 ,574	Cu I	50	1492,624	N I	80
1741 ,378	Cu III	500	1488,637	Cu II	75
1738 ,91	Mg III	6	1479,65	Fe IV	38
1725 ,664	Cu I	50	1475,67	Fe IV	28
1725 ,01	Al II	15	1472,13	Fe IV	35
1722,379	Cu III	1000	1469,610	Xe I	5
1721,31	Al II	10	1467,25	Ti IV	30
1718,551	N IV	20	1464,81	Fe IV	40
1713,364	Cu I	50	1464,73	Fe V	6
1709,036	Cu III	700	1459,92	Fe IV	40
1703,843 1702,994 1691,076 1688,093 1687,134	Cu I Cu III Cu I Cu I Cu III Cu III	30 500 30 30 600 500	1455 ,22 1451 ,75 1448 ,91 1440 ,59 1432 ,538	Ti III Ti IV Fe V Fe V C I	40 30 6 7 10
1684,642	Li II	4	1432,115	C I	15
1682,4	Cu III	500	1431,595	C I	20
1674,602	Si IV	150	1430,61	Fe V	8
1673,374	Cu III	500	1422,41	Ti III	25
1671,886	Al II	15	1411,939	N I	30
1670 ,81 1670 ,140 1656 ,998 1655 ,318 1653 ,9	Cu III C I Cu I Li II	500 10 30 8	1411,335 1409,51 1409,19 1406,78 1402,770	Fe V Fe V Fe V Si IV	7 6 7 12

λ, Å	Symbol	I	λ, Ă	Symbol	I
1402,45	Fe V	6	1188,768	Cl I	12
1393,755	Si IV	15	1178,65	Cs II	10
1379,529	Cl I	11	1164,868	Kr I	4
1376,45	Fe V	6	1144,946	Fe II	35
1373,68	Fe V	6	1130,344	Xe III	30
1371,287	O V	10	1128,340	Si IV	10
1363,449	Cl I	10	1128,325	Si IV	10
1351,657	Cl I	10	1113,228	Si III	18
1350,057	Si II	150	1112,086	Fe II	35
1347,238	Cl I	12	1109,965	Si III	16
1335,684	C II	14	1108,368	Si III	14
1334,515	C II	13	1101,293	N I	40
1319,684	N I	30	1100,46	Xe I	15
1309,274	Si II	200	1100,432	Xe II	10
1306,025	O I	25	1100,362	N I	30
1304,866	O I	30	1098,264	N I	40
1303,320	Si III	16	1098,103	N I	40
1302,173	O I	30	1097,245	N I	50
1301,146	Si III	14	1096,886	Fe II	30
1298,95	Ti III	40	1096,749	N I	35
1298,960	Si III	18	1096 ,322	N I	35
1298,891	Si III	15	1095 ,940	N I	35
1298,67	Ti III	50	1085 ,701	N II	12
1296,726	Si III	14	1085 ,542	N II	9
1295,91	Ti III	30	1084 ,572	N II	11
1295 ,587	Xe I	8	1083,990	N II	10
1294 ,67	Ti III	50	1079,08	Cl II	15
1294 ,543	Si III	17	1074,476	Xe II	15
1293 ,26	Ti III	30	1071,76	Cl II	10
1291 ,969	Si IV	30	1071,596	Fe II	30
1289 ,32	Ti III	30	1071,05	Cl II	20
1286 ,38	Ti III	40	1069,984	N I	30
1280 ,336	Si IV	20	1068,476	N I	35
1277 ,617	C I	10	1067,607	N I	35
1277 ,274	C I	9	1066,660	Ar I	15
1265,023	Si II	200	1063,83	Cl II	10
1264,730	Si II	2000	1063,003	Cu II	60
1260,418	Si II	1000	1060,630	Cu II	60
1259,54	Fe IV	30	1059,096	Cu II	60
1251,164	Si II	200	1056,955	Cu II	60
1242,804	N V	19	1056,582	Si IV	12
1238,821	N V	20	1054,690	Cu II	60
1235,839	Kr I	13	1051,920	Xe II	10
1232,074	Xe III	25	1051,596	Si IV	70
1229,388	Si II	200	1048,272	Xe II	8
1215 ,670	H	3000	1048 ,218	Ar I	25
1215 ,340	D	3000	1044 ,743	Cu II	80
1215 ,229	T	3000	1044 ,516	Cu II	80
1215 ,171	He II	5	1041 ,306	Xe II	9
1206 ,533	Si III	30	1040 ,941	O I	15
1206 ,510	Si III	30	1039,569	Cu II	60
1201 ,358	Cl I	11	1039,345	Cu II	60
1200 ,711	N I	30	1039,233	O I	20
1199 ,549	N I	50	1037,613	O VI	9
1198 ,6	Li II	7	1037,017	C II	13
1194 ,496	Si II	250	1036 ,470	Cu II	60
1193 ,284	Si II	200	1036 ,330	C II	12
1193 ,284	C I	10	1031 ,912	O VI	10
1191 ,55	Cs II	8	1027 ,433	O I	20

		1			
λ, Å	Symbol	I	λ, Α	Symbol	I
1025,722	H	1000	923,220	N IV	16
1025,443	D	1000	923,057	N IV	14
1025,350	T	1000	922,519	N IV	14
1017,680	Xe III	35	921,992	N IV	14
1015,023	Cl III	7	919,7815	Ar II	10
1010 ,369	C II	10	919 ,78	O II	15
1010 ,074	C II	10	916 ,700	N II	12
1008 ,777	Cl III	6	916 ,004	N II	11
1003 ,370	Xe III	35	915 ,955	N II	10
997 ,389	Si III	16	915 ,603	N II	10
995,50	Xe VII	3	914,209	Cu II	80
994,787	Si III	13	911,384	Kr II	25
992,675	Si II	200	906,426	N I	15
991,579	N III	17	906,202	N I	10
991,514	N III	14	904,468	C II	10
989 ,790	N III	16	904 ,134	C II	12
988 ,776	O I	15	903 ,950	C II	11
984 ,952	Cl IV	7	903 ,609	C II	10
977 ,745	F I	100	901 ,34	Cs II	20
977 ,026	C III	18	897 ,801	Kr III	40
976 ,217	FI	100	896 ,753	Cu II	60
973 ,895	FI	350	896 ,003	Xe III	20
972 ,537	H	400	893 ,989	Xe III	20
972 ,272	D	400	893 ,905	Al III	5
972 ,184	T	400	893 ,674	Cu II	80
968,518	K VI	6	891 ,999	Si II	200
965,042	N I	10	890 ,567	Cu II	60
964,962	Kr II	30	887 ,404	Ar III	10
961,49	Cl II	10	886 ,946	Cu II	60
958,524	F I	500	886 ,302	Kr II	30
955,545 955,335 954,825 953,658 953,415	FI NIV FI NI	750 20 1000 15 15	884 ,144 883 ,179 880 ,04 879 ,622 878 ,728	Kr II Ar III Xe VI Ar III Ar III	30 9 2 8 12
951 ,871 949 ,743 949 ,485 949 ,401 945 ,524	F I H D T Cu II	500 200 200 200 200 60	877 ,9 876 ,674 875 ,534 871 ,099 870 ,825	Cs III Kr III Ar III Ar III Kr III	7 22 9 10 20
943 ,328	Cu II	60	868,869	Kr II	25
935 ,892	Cu II	60	862,578	Kr III	35
935 ,074	Cu II	60	858,59	Xe VIII	3
932 ,940	Cu II	60	856,768	Al III	5
932 ,687	Fe II	30	854,733	Kr III	25
932 ,244	Fe II	30	852,950	Xe III	25
932 ,0528	Ar II	10	850,602	Ar IV	25
932 ,046	O II	10	844,058	Kr II	25
930 ,558	Fe II	30	843,772	Ar IV	20
930 ,165	Fe II	30	842,035	Kr IV	22
930,030 929,612 929,538 928,107 927,176	Fe II Fe II Fe II Fe II Fe II	30 30 30 30 30 20	840,029 837,666 835,292 835,096 835,003 834,67	Ar IV Kr III O III O III Ar I Cl II	15 22 16 14 6
926,75 924,283 923,884 923,675	Cs II N IV Fe II N IV	14 30 14	834 ,462 834 ,397 833 ,742	O II Ar I O III	15 6 16

λ, Α	Symbol		2. A	Symbol	I I
833 ,326	O II	15	723 ,71	Xe VII	3
832 ,927	O III	14	722 ,2	Cs III	2
832 ,754	O II	14	722 ,036	Kr III	50
827 ,055	Ar V	5	722 ,036	Kr II	50
824 ,881	Xe III	30	718 ,562	O II	16
823 ,210	Xe III	25	718 ,484	O II	17
818 ,147	Kr II	25	709 ,195	Ar V	5
818 ,128	Si IV	8	708 ,85	Kr V	8
816 ,822	Kr IV	18	705 ,84	Kr VI	8
815 ,053	Si IV	7	703 ,850	O III	18
813 ,85	Cs II	20	702,899	O III	17
809 ,599	F I	125	702,822	O III	16
808 ,77	Cs II	20	700,24	Ar VIII	10
806 ,964	F I	150	698,541	Xe III	20
805 ,763	Kr IV	7	698,037	Kr III	20
801,409	Ar IV	10	698,02	Xe VII	10
801,086	Ar IV	10	695,91	Kr VIII	8
800,84	Xe VI	2	695,817	Al III	5
796,661	O II	10	689,007	Ar IV	12
790,103	O IV	13	687,355	C II	11
787,710	O IV	15	687,059	C II	10
785,968	Kr III	25	686,335	N III	14
782,6	Cs III	3	686,254	Kr III	20
782,084	Kr II	25	685,816	N III	16
781,78	Ti IV	20	685,513	N III	15
780, 324	Ne VIII	4	684 ,996	N III	14
779, 905	O IV	10	683 ,278	Ar IV	10
779, 126	Xe III	25	682 ,56	Xe V	3
779, 14	Ti IV	20	680 ,119	Kr III	22
775, 957	N II	12	679 ,400	Ar II	6
772,385	N III	12	679 ,217	F IV	16
771,901	N III	11	679 ,003	F IV	13
771,544	N III	10	677 ,224	F IV	15
770,409	Ne VIII	8	677 ,154	F IV	13
769,152	Ar III	12	676 ,564	Kr III	25
765,148	N IV	15	676 ,241	Ar III	6
764,357	N III	15	676 ,130	F IV	14
763,340	N III	14	672 ,948	O II	8
762,001	O V	10	672 ,330	Kr III	25
761,130	O V	10	671 ,391	N II	8
760 ,445	O V	12	669,725	Ca IV	10
760 ,229	O V	10	668,43	Cs II	12
759 ,440	O V	10	666,010	Ar II	6
758 ,677	O V	10	663,039	Kr III	20
752 ,051	Kr II	30	660,280	N II	9
746 ,976	N II	7	659 ,716	Kr III	22
745 ,323	Ar II	7	658 ,337	F III	12
745 ,264	K IV	10	656 ,878	F III	11
744 ,925	Ar II	8	656 ,125	F III	10
743 ,721	Ne I	12	656 ,038	Ca IV	15
742 ,83	Kr VI	8	651 ,57	Kr VIII	10
741 ,950	K IV	10	646 ,570	Ca V	8
740 ,44	Xe VIII	7	646 ,417	Kr III	20
740 ,270	Ar II	10	646 ,188	K IV	15
737 ,144	K IV	10	645 ,167	N II	10
735 ,892	Ne I	$\frac{30}{8}$	645 ,0	Cs III	4
729 ,1	Li III		644 ,825	N II	9
724 ,420	K VI		644 ,621	N II	8
724 ,420	K V		644 ,148	O II	12

λ, Λ	Symbol	1	λ. Α	Symbol	1
643 ,256 641 ,808 639 ,42 637 ,282 629 ,732	Ar III Ar III Cs II Ar III O V	9 12 12 20 15	555 ,485 555 ,262 554 ,619 554 ,52 554 ,514	Cl VI O IV Cl IV Kr VI O IV	20 16 7 5
629 ,729	Ne I	6	554,074	O IV	17
626 ,819	Ne I	6	553,470	Ar III	9
625 ,852	O IV	14	553,328	O IV	16
625 ,130	O IV	14	552,017	CI IV	7
624 ,617	O IV	13	551,992	CI VI	10
623,016	K VI	8	551 ,371	Ar VI	8
618,67	Kr VI1	1	550 ,2	Cs III	2
618,668	Ne I	5	547 ,8	Cs III	2
616,136	K VI	6	547 ,630	Cl V	10
615,623	Ne I	5	546 ,846	F II	6
612,621	K II	4	546 ,329	Cl V	6
609,829	O IV	15	545 ,114	Cl V	10
608,395	O IV	14	544 ,03	Kr VI	5
608,065	F II	7	543 ,891	Ne IV	150
607,931	K II	5	542 ,297	Cl V	6
607,472	FII	6	542,290	Ca V	10
606,805	FII	8	542,229	Cl V	8
606,284	FII	6	542,073	Ne IV	100
605,668	FII	7	539,547	O II	8
603,429	KV	8	539,086	O II	8
600,765 599,84 599,598 597,818 595,7	K II Xe VI O III O III Cs III	6 3 18 15 2	538 ,3120 538 ,256 538 ,150 538 ,075 538 ,032	C III C III C III	13 10 12 11 5
586,322	K V	8	537,830	O II	9
585,754	Ar VII	15	537,606	Cl IV	9
585,37	Kr VII	8	537,030	He I	200
584,334	He I	500	535,666	Cl IV	7
580,319	K V	7	535,288	C III	10
576 ,8	Fe IV	40	027 (300	F VI	10
574 ,5	Fe IV	50		CI IV	8
574 ,279	C III	12		Ar III	9
572 ,637	F IV	16		Ca III	8
572 ,336	Ne V	80		Ar V	6
571 ,384	F IV	15	526,28	Fe IV	75
571 ,302	F IV	14	525,795	O III	18
570 ,636	F IV	14	525,68	Fe IV	100
569 ,830	Ne V	50	524,189	Ar V	5
569 ,13	Kr VI	5	522,213	He I	80
567 ,737	F III	9	517,00	Xe VIII	2
567 ,676	F III	10	514,945	F II	6
566 ,04	Xe VII	2	511,527	C III	10
562 ,805	Ne VI	15	508,434	Ar III	9
562 ,55	Xe VIII	2	508,384	F III	10
561,738	Cl III	7	508, 182	O III	18
561,680	Cl III	7	507, 683	O III	17
561,530	Cl III	7	505, 199	Ca VI	8
560,390	Al III	7	497, 104	K III	15
558,602	Ca V	10	495, 144	K II	6
558,481 557,118 556,605 556,232	Ar V Cl III Cl III Cl III	5 7 7 6	491 ,340 491 ,050 490 ,997 490 ,566	Na VI Ne III F IV F IV	9 16 13

λ, Λ	Symbol	I	λ, Λ	Symbol	1
490 ,310	Ne III	7	434 ,722	K III	15
489 ,580	Na VI	5	434 ,570	Ca IV	12
489 ,501	Ne III	10	430 ,758	F IV	15
488 ,868 488 ,120	Ne III K VI	7 10	430 ,156 430 ,154 429 ,511	F III F III	11 10
488 ,103	Ne III	8	425 ,588	K V	7
486 ,172	Cl IV	8	425 ,000	Ca V	15
485 ,084	K II	5	422 ,287	Fe V	6
484 ,600	F II	8	421 ,609	Ne IV	150
482 ,987	Ne V	50	420 ,727	F IV	16
479,379	Ar VII	12	420,041	F IV	15
475,656	Ar VII	8	419,714	C IV	14
472,16	Kr V	3	419,644	F IV	14
471,990	F II	6	419,525	C IV	13
471,569	K III	15	418,033	Fe V	6
470,089	K III	20	417,595	Na VI	6
469,865	Ne IV	200	417,382	Fe V	6
469,817	Ne IV	200	416,198	Ne V	80
466,995	F V	5	415,505	Na VI	4
466,793	K III	15	412,240	Na IV	8
465 ,978	F V	7	411,333	Na IV	7
465 ,374	F V	6	410,540	Na IV	6
465 ,27	Kr VI	6	410,371	Na IV	10
465 ,21	Ne VII	10	409,971	Ca III	18
465 ,113	F III	10	409,615	Na IV	8
464 ,370	F V	5	408,682	Na IV	8
464 ,284	F III	9	407,136	Ne II	8
464 ,270	K VI	10	405,852	Ne II	9
463 ,938	Ar V	7	403,732	Ca III	20
463 ,263	Na V	12	403,315	Mg VI	8
462 ,388	Ne II	14	403,262	Ne VI	10
462 ,007	Ar VI	25	401,939	Ne VI	25
461 ,227	Ar VI	6	401,138	Ne VI	15
461 ,227	Ar V	6	400,722	Na V	10
461 ,051	Na V	10	400,676	Mg VI	7
460 ,725	Ne II	15	399 ,289	Mg VI	6
460 ,438	K VI	8	393 ,142	K IV	10
459 ,897	Na V	7	392 ,907	Fe V	6
459 ,633	C III	15	392 ,433	Cl V	5
459 ,521	C III	14	388 ,218	Ne IV	100
459 ,462	C III	13	387 ,141	Ne IV	125
459 ,320	Ar VI	10	386 ,203	C III	14
458 ,048	K VI	7	384 ,957	Fe V	6
457 ,475	Ar VI	20	384 ,178	C IV	17
457 ,177	F II	6	384 ,032	C IV	16
452,226	N III	11	379 ,308	Ne III	7
451,869	N III	10	376 ,375	Na II	3
450,565	Ca IV	10	374 ,441	N III	12
449,065	Ar V	18	374 ,204	N III	11
448,595	K III	15	374 ,075	O III	10
447 ,813	Ne II	8	373,997	Ca VI	7
446 ,949	Ar V	8	372,148	K V	10
446 ,252	Ne II	8	372,069	Na II	6
445 ,997	Ar V	5	370,022	Ca VI	7
445 ,190	Na V	7	366,110	Na VI	4
444 ,344	K III	15	365 ,858	Fe V	6
443 ,821	Ca IV	15	365 ,594	Ne V	100
440 ,429	K III	15	365 ,440	Fe V	6
434 ,975	O III	10	362 ,444	Na VI	4

λ, Å	Symbol	I	λ, Λ	Symbol	1
361,250	Na VI	8	292,736	Fe VI	7
360,367	Na V	8	291,229	Fe VI	6
360,319	Na V	8	291,184	Fe VI	6
359 ,385 358 ,721	Ne V Ne IV	$\frac{50}{200}$	289 ,143 286 ,965	C IV Ca V	9
358,472	Ne V	50	283,579	N IV	12
357,973	Ca III	8	283,379	N IV	11
355,326	Mg V	12	283,420	N IV	10
354,223	Mg V	10	282,423	Ar VI	6
353,300	Mg V	9	281,397	Al V	14
353,094	Mg V Ca V	14	279,937	O IV O IV	11 10
352 ,915 352 ,202	Mg V	9 10	279 ,633 278 ,699	Al V	16
351,089	Mg V	12	276,581	Mg V	16
349,155	Mg VI	10	270,394	Mg VI	1 2
345,309	O III	10	268,986	Mg VI	10
340,528	Ca VI	8 6	267,772 $266,378$	Ca V N V	8 9
337 ,998 336 ,555	Ar V Ca IV	15	266,197	N V	8
335,374	Ca IV	$\frac{1}{25}$	260,389	O IV	10
335,050	N IV	11	256 ,317	He I	150
333,910	Na V	9	250,940	Ar VII	7
332,550 328,448	Na V O III	8 10	248 ,744 248 ,668	$egin{array}{c} \mathbf{C} \ \mathbf{V} \end{array}$	0
325,440	Cl VI	$\frac{10}{25}$	247,709	йv	Ÿ
323,936	Cl VI	20	247,564	ΝV	6
323,356	Cl VI	15	244,907	CIV	10
323,310	Mg IV	18 10	243,854 243,760	Cl VI Al VI	12 12
322 ,166 321 ,593	Ca V Ca IV	10	243,700	He II	70
320,999	Mg IV	20	239,535	Ca VI	7
320,979	OIII	12	238,573	O IV	15
319,638	Na IV	10	238,361 234,258	O IV Mg III	14 12
318,093 317,641	Ca IV Na VI	15 6	234,236	Mg III	14
313,748	Na VI	5	230 ,875	Ar VIII	7
312,455	CIV	14	229,734	Ca VI	7
312,418	CIV	15	990 000	Ti V	75
312,311 312,263	Mg V Fe VI	10 7	228,898 228,628	Ca VI	7
311,921	Na VI	4	225 ,337	Ti V	100
311,702	Fe VI	7	220 ,352	o v	13
308,264	Na V	10	212,556	Ne IV	15 0
307, 152 305, 769	Na V O III	8 10	208 ,734	Ne IV	100
•		9	208,485 $207,794$	Ne IV O V	100 10
305,656 304,551	O III Fe VI	7	199,759	Ti VI	6
304,221	Fe VI	7			0
303,799	OIII	9	198,974	Ti VI Ti VI	8 7
303,783	He II	500	194,900	O V	14
300 ,252 297 ,568	K V Fe VI	7 8	192,906 192,800	o v	13
297,308 297,308	Fe VI	7	192,751	o v	12
296,988	Fe VI	6	192,747	Ti VI	8 7
294,520	Fe VI	7	192,635	Ar VII	7
294,265	Fe VI Ar VI	7 6	190,839 190,835	F V Na IV	8
294 ,052 293 ,966	Fe VI	8	190,571	$\mathbf{F} \mathbf{V}$	6
293,745	Fe VI	8	190,440	Na IV	10
					(

λ, Α	Symbol	I	λ, Λ	Symbol	I
187 ,194	Mg III	8	125,525	Al V	15
186 ,842	F V	5	124,153	Na VI	4
186 ,510	Mg III	9	124,059	Na VI	4
184 ,117	O VI	9	124,034	Al IV	8
183 ,937	O VI	8	123,929	Na VI	5
181,758 181,345 180,796 180,617 180,254	Na IV Mg IV Mg IV Mg IV Ar VIII	8 8 9 10 15	122,686 122,520 120,331 118,968 117,860 116,459	Ne VI Ne VI O VII Si V Si V Al IV	10 20 0 20 20 7
180,070 179,400 178,434 176,566 173,082	Mg IV Ar VIII F V Ar VII O VI	8 10 5 10 13	110,439 113,93 109,896 109,514 107,945 107,683 107,620	Li III Na VI Al VI Al V Na VI Al VI	5 20 20 5 14
172 ,935 172 ,306 172 ,163 171 ,653 170 ,802	O VI Mg IV O V Mg IV Mg III	12 7 12 8 5	107,608 107,288 106,2 106,1	Na VI Na VI Ne VII Ne VII	4 4 7 7
168 ,409	Na IV	8	104,344	Al VI	16
168 ,084	Na IV	10	104,047	Al VI	20
166 ,177	F V	10	99,460	Si VI	15
165 ,983	F V	9	98,2	Ne VIII	9
163 ,558	F V	5	98,1	Ne VIII	9
162,445 161,686 160,073 158,923 156,536	Na IV Al IV Al IV Ar VIII Na IV	8 14 16 8 8	97,143 96,439 92,626 88,469 88,1 85,764	Si V Si V Al VI Al VI Ne VIII Al VI	10 15 15 5 9 8
156,247	F VI	6	85,724	Al VI	6
150,124	O VI	9	85,622	Al VI	6
150,088	O VI	10	85,175	Si V	10
148,002	F V	5	84,082	Si VI	12
139,900	F VI	7	83,128	Si VI	15
139,800	F VI	6	80 ,577	Si VI	12
139,758	F VI	5	77 ,945	Al VI	10
137,414	Mg V	8	74 ,656	Al VI	5
135,02	Li III	—	74 ,444	Al VI	6
134,539	F V	5	72 ,810	Al VI	5
131,441	Al V	20	40 ,731	C V	_
131,003	Al V	20	40 ,270	C V	_
130,848	Al V	20	34 ,973	C V	_
130,413	Al V	20	33 ,734	C VI	_
130,403	Al IV	11	33 ,426	C V	_
129,872 129,786 129,729 128,500 128,412	O VI O VI Al IV O VII O VII	6 5 12 0 0	29,084 28,787 28,464 26,988 24,898	N VI N VI C VI C VI N VI	
127,837	Na VI	4	23,771	N VI	
126,923	F VI	5	21,804	O VII	
126,065	Al V	15	21,602	O VII	

Section III

Complete Tables of Spectral Lines with Their Classification Arranged by Element and Degree of Ionization

DEUTERIUM, Z = 1 D, ground state $1s^{2}S_{1/2}$

D, ground state $1s^{-2}S_{1/2}$ Ionization potential 109708,596 cm⁻¹; 13,601 eV

					
J	Transition	$E_{ m B}$. eV	E _H , eV	I	λ, Å
For all the transitions indicated of this series $\frac{5}{2}$, $\frac{3}{2}$, $\frac{7}{2}$, $\frac{5}{2}$	$3d^{2}D-4f^{2}F^{\circ}$ etc. $3d^{2}D-5f^{2}F^{\circ}$ etc. $3d^{2}D-6f^{2}F^{\circ}$ etc. $3d^{2}D-7f^{2}F^{\circ}$ etc. $3d^{2}D-8f^{2}F^{\circ}$ etc.	12,75 13,06 13,22 13,32 13,39	12,09 12,09 12,09 12,09 12,09	700 140 28 6 5	18746 ,0 12814 ,56 10935 ,11 10046 ,64 9543 ,376
	$3d\ ^2D-9f\ ^2F^\circ$ etc. $3d\ ^2D-10f\ ^2F^\circ$ etc. $3d\ ^2D-11f\ ^2F^\circ$ etc. $3d\ ^2D-12f\ ^2F^\circ$ etc. Limit of series	13,43 13,46 13,48 13,50 13,60	12,09 12,09 12,09 12,09 12,09 12,09	4 3 2 —	9226,505 9012,457 8860,374 8748,093 8201,334
For all the transitions indicated of this series $3/2$, $1/2$ — $5/2$, $3/2$	$2p \ ^{2}P^{\circ} - 3d \ ^{2}D$ etc. $2p \ ^{2}P^{\circ} - 4d \ ^{2}D$ etc. $2p \ ^{2}P^{\circ} - 5d \ ^{2}D$ etc. $2p \ ^{2}P^{\circ} - 6d \ ^{2}D$ etc. $2p \ ^{2}P^{\circ} - 7d \ ^{2}D$ etc.	12,09 12,75 13,06 13,22 13,32	10,20 10,20 10,20 10,20 10,20	3000 500 200 100 80	D_{α} 6561,032 D_{β} 4860,029 D_{γ} 4339,287 D_{δ} 4100,621 D_{ε} 3968,995
	$2p ^{2}P^{\circ} - 8d ^{2}D$ etc. $2p ^{2}P^{\circ} - 9d ^{2}D$ etc. $2p ^{2}P^{\circ} - 10d ^{2}D$ etc. $2p ^{2}P^{\circ} - 11d ^{2}D$ etc. Limit of series	13,39 13,43 13,46 13,48 13,60	10,20 10,20 10,20 10,20 10,20	60 40 20 15	3887,993 3834,342 3796,866 3769,606 3644,989
For all the transitions of this series $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$	$1s^{2}S - 2p^{2}P^{\circ}$ $1s^{2}S - 3p^{2}P^{\circ}$ $1s^{2}S - 4p^{2}P^{\circ}$ $1s^{2}S - 5p^{2}P^{\circ}$ $1s^{2}S - 6p^{2}P^{\circ}$	10,20 12,09 12,75 13,06 13,22	0,00 0,00 0,00 0,00 0,00	3000 1000 400 200 120	1215,340 1025,443 972,272 949,485 937,548
	$1s^{2}S - 7p^{2}P^{\circ}$ $1s^{2}S - 8p^{2}P^{\circ}$ $1s^{2}S - 9p^{2}P^{\circ}$ $1s^{2}S - 10p^{2}P^{\circ}$ Limit of series	13,32 13,39 13,43 13,46 13,60	00, 00 00, 00 00, 00 00, 00	80 50 40 30	930 ,495 925 ,974 922 ,899 920 ,713 911 ,505

TRITIUM, Z = 1 T. o ground state $1s^{-2}S_{1/2}$

T, o ground state $1s^{-2}S_{1/2}$ Ionization potential 109718,526 cm⁻¹; 13,603 eV

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
18744,3 12813,40 10934,12 10045,73 9542,509	700 140 28 6 5	12,09 12,09 12,09 12,09 12,09	12,75 13,06 13,22 13,32 13,39	$3d\ ^2D-4f\ ^2F^\circ$ etc. $3d\ ^2D-5f\ ^2F^\circ$ etc. $3d\ ^2D-6f\ ^2F^\circ$ etc. $3d\ ^2D-7f\ ^2F^\circ$ etc. $3d\ ^2D-8f\ ^2F^\circ$ etc.	For all the transitions indicated of this series $\frac{5}{2}$, $\frac{3}{2}$, $\frac{7}{2}$, $\frac{5}{2}$
9225,667 9011,639 8859,570 8747,298 8200,594	4 3 2 —	12,09 12,09 12,09 12,09 12,09	13,43 13,46 13,48 13,50 13,60	$3d\ ^2D - 9f\ ^2F^\circ$ etc. $3d\ ^2D - 10f\ ^2F^\circ$ etc. $3d\ ^2D - 11f\ ^2F^\circ$ etc. $3d\ ^2D - 12f\ ^2F^\circ$ etc. Limit of series	
T_{α} 6560 ,435 T_{β} 4859 ,595 T_{γ} 4338 ,893 T_{δ} 4400 ,249 T_{ε} 3968 ,637	3000 500 200 100 80	10,20 10,20 10,20 10,20 10,20	12,09 12,75 13,06 13,22 13,32	$2p \ ^{2}P^{\circ}$ — $3d \ ^{2}D^{\circ}$ etc. $2p \ ^{2}P^{\circ}$ — $4d \ ^{2}D^{\circ}$ etc. $2p \ ^{2}P^{\circ}$ — $5d \ ^{2}D^{\circ}$ etc. $2p \ ^{2}P^{\circ}$ — $6d \ ^{2}D$ etc. $2p \ ^{2}P^{\circ}$ — $7d \ ^{2}D$ etc.	For all the transitions indicated of this series $\frac{3}{2}$, $\frac{1}{2}$ — $\frac{5}{2}$, $\frac{3}{2}$
3887,640 3833,994 3796,522 3769,264 3644,656	60 40 20 15	10,20 10,20 10,20 10,20 10,20	13,39 13,43 13,46 13,48 13,60	$2p ^{2}P^{\circ} - 8d ^{2}D$ etc. $2p ^{2}P^{\circ} - 9d ^{2}D$ etc. $2p ^{2}P^{\circ} - 10d ^{2}D$ etc. $2p ^{2}P^{\circ} - 11d ^{2}D$ etc. Limit of series	
1215 ,229 1025 ,350 972 ,184 945 ,401 937 ,464	3000 1000 400 200 120	00, 00 00, 0 00, 0 06, 0 00, 0	10,20 12,09 12,75 13,06 13,22	$1s^{2}S-2p^{2}P^{\circ}$ $1s^{2}S-3p^{2}P^{\circ}$ $1s^{2}S-4p^{2}P^{\circ}$ $1s^{2}S-5p^{2}P^{\circ}$ $1s^{2}S-6p^{2}P^{\circ}$	For all the transitions of this series $\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$
930 ,410 925 ,890 922 ,815 920 ,629 911 ,422	80 50 40 30	0,00 0,00 0,00 0,00 0,00	13,32 13,39 13,43 13,46 13,60	1s ${}^{2}S$ -7p ${}^{2}P^{\circ}$ 1s ${}^{2}S$ -8p ${}^{2}P^{\circ}$ 1s ${}^{2}S$ -9p ${}^{2}P^{\circ}$ 1s ${}^{2}S$ -10p ${}^{2}P^{\circ}$ Limit of series	

HELIUM, Z = 2

He I, ground state $1s^{2-1}S_0$ Ionization potential 198310,8 cm⁻¹; 24,586 eV

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λ, Α	I	E _H . eV	E _B , eV	Transition	J
21132,04 21121,31 21120,04 20581,30 19543,13	40 150 150 10 000 65	23,09 23,01 23,01 20,61 23,07	23,67 23,59 23,59 21,22 23,71	$3p^{1}P^{\circ} - 4s^{1}S$ $3p^{3}P^{\circ} - 4s^{3}S$ $3p^{3}P^{\circ} - 4s^{3}S$ $2s^{1}S - 2p^{1}P^{\circ}$ $3d^{3}D - 4p^{3}P^{\circ}$	$ \begin{array}{c} 1-0\\0-1\\2,1-1\\0-1\\3,2,1-2,1,0 \end{array} $
19089,37 18696,94 18685,96 18555,55 17003,15	550 1500 3600 6 200	23,09 23,07 23,07 23,07 23,01	23,74 23,74 23,74 23,74 23,73	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 2-3 \\ 1-4, 3, 2 \\ 2-1 \\ 0-1 \end{array} $
17002 ,38 15083 ,66 12968 ,44 12845 ,95 12790 ,27	1800 60 50 30 125	23,01 22,92 23,09 23,01 23,07	23,73 23,74 24,04 23,97 24,04	$3p ^3P^{\circ} - 4d ^3D$ $3s ^1S - 4p ^1P^{\circ}$ $3p ^1P^{\circ} - 5d ^1D$ $3p ^3P^{\circ} - 5s ^3S$ $3d ^1D - 5f ^1F^{\circ}$	$\begin{array}{c} 2, 1-3, 2, 1 \\ 0-1 \\ 1-2 \\ 2, 1, 0-1 \\ 2-3 \end{array}$
12784,79 12527,51 11969,48 11969,07 11225,90	400 100 — 220 —	23,07 22,72 23,01 23,01 23,09	24,04 23,71 24,04 24,04 24,19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3, 2, 1-4, 3, 2 \\ 1-2, 1, 0 \\ 0-1 \\ 2, 1-3, 2, 1 \\ 1-0 \end{array}$
11045,00 11013,07 10996,56 10916,98 10912,92	8 8 3 25 60	23,09 22,92 23,07 23,07 23,07	24,21 24,04 24,20 24,21 24,21	$\begin{array}{cccc} 3p ^1P^{\circ} & -6d ^1D \\ 3s ^1S & -5p ^1P^{\circ} \\ 3d ^3D & -6p ^3P^{\circ} \\ 3d ^1D & -6f ^1F^{\circ} \\ 3d ^3D & -6f ^3F^{\circ} \end{array}$	$ \begin{array}{c} 1-2 \\ 0-1 \\ 3, 2, 1-2, 1, 0 \\ 2-3 \\ 3, 2, 1-4, 3, 2 \end{array} $
10902,16 10830,337 10830,248 10829,088 10667,65	15 000	23,07 19,82 19,82 19,82 23,01	24,21 20,96 20,96 20,96 24,17	$3d ^{1}D -6p ^{1}P^{\circ} \ 2s ^{3}S -2p ^{3}P^{\circ} \ 2s ^{3}S -2p ^{3}P^{\circ} \ 2s ^{3}S -2p ^{3}P^{\circ} \ 3p ^{3}P^{\circ} -6s ^{3}S$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 1-0 \\ 2, 1, 0-1 \end{array} $
10311,54 10311,23 10233,06 10138,50 10072,04	7 50 2 5 3	23,01 23,01 23,09 23,09 23,07	24,21 24,21 24,30 24,31 24,30	$3p ^3P^{\circ} -6d ^3D$ $3p ^3P^{\circ} -6d ^3D$ $3p ^1P^{\circ} -7s ^1S$ $3p ^1P^{\circ} -7d ^1D$ $3d ^3D -7p ^3P^{\circ}$	$ \begin{array}{c} 0-1 \\ 2, 1-3, 2, 1 \\ 1-0 \\ 1-2 \\ 3, 2, 1-2, 1, 0 \end{array} $
10031,16 10027,73 9702,60 9682,19 9625,64	10 30 15 1 3	23,07 23,07 23,01 23,09 23,09	24,31 24,31 24,28 24,37 24,37	$3d ^{1}D$ $-7f ^{1}F^{\circ}$ $3d ^{3}D$ $-7f ^{3}F^{\circ}$ $3p ^{3}P^{\circ}$ $-7s ^{3}S$ $3p ^{1}P^{\circ}$ $-8s ^{1}S$ $3p ^{1}P^{\circ}$ $-8d ^{1}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9603,42 9552,89 9529,27 9526,17 9516,87	5 2 5 15 3	22,92 23,07 23,07 23,07 23,01	24,21 24,37 24,37 24,37 24,31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9516,60 9463,61 9210,337 9174,52 9063,27	20 50 10 2 6	23,01 22,72 23,07 23,01 23,01	24,31 24,03 24,42 24,37 24,37	$3p ^3P^{\circ} -7d ^3D$ $3s ^3S -5p ^3P^{\circ}$ $3d ^3D -9f ^3F^{\circ}$ $3p ^3P^{\circ} -8s ^3S$ $3p ^3P^{\circ} -8d ^3D$	2, 1-3, 2, 1 1-2, 1, 0 3, 2, 1-4, 3, 2 2, 1, 0-1 2, 1, 0-3, 2, 1
8996 ,978 8914 ,74	$\frac{2}{2}$	23,07 22,92	24 ,45 24 ,31	$\begin{array}{ccc} 3d\ ^3D & -10f\ ^3F^{\circ} \\ 3s\ ^1S & -7p\ ^1P^{\circ} \end{array}$	3, 2, 1—4, 3, 2 0—1

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λ. Λ	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
8776 ,74 8361 ,69 7816 ,15	2 10 5	23,01 22,72 22,72	24 ,42 24 ,20 24 ,30	3p ³ P°-9d ³ D 3s ³ S-6p ³ P° 3s ³ S-7p ³ P°	2, 1, 0-3, 2, 1 1-2, 1, 0 1-2, 1, 0
7281,349 7065,707 7065,190 6678,151 5875,966	500 300 2500 1000 1000	21,22 20,96 20,96 21,22 20,96	22,92 22,72 22,72 23,07 23,07	$2p ^{1}P^{\circ} - 3s ^{1}S$ $2p ^{3}P^{\circ} - 3s ^{3}S$ $2p ^{3}P^{\circ} - 3s ^{3}S$ $2p ^{1}P^{\circ} - 3d ^{1}D$ $2p ^{3}P^{\circ} - 3d ^{3}D$	$ \begin{array}{c} 1-0\\0-1\\2\\1-1\\1-2\\0-1 \end{array} $
5875,621 5047,738	7500 50	20,96 21,22	23 ,07 23 ,67	2p ³ P°-3d ³ D 2p ¹ P°-4s ¹ S	2, 1—3, 2, 1 1—0
5015 ,6779 4921 ,9310 4713 ,376		20,61 21,22 20,96	23 ,09 23 ,74 23 ,59	2s ¹S-3p ¹P° 2p ¹P°-4d ¹D 2p ³P°-4s ³S	0-1 $1-2$ $0-1$
4713 ,1455 4471 ,682 4471 ,479 4437 ,551 4387 ,9294	120 1000 15	20,96 20,96 20,96 21,22 21,22	23,59 23,73 23,73 24,01 24,04	$2p {}^{3}P^{\circ} - 4s {}^{3}S$ $2p {}^{3}P^{\circ} - 4d {}^{3}D$ $2p {}^{3}P^{\circ} - 4d {}^{3}D$ $2p {}^{1}P^{\circ} - 5s {}^{1}S$ $2p {}^{1}P^{\circ} - 5d {}^{1}D$	2, 1-1 0-1 2, 1-3, 2, 1 1-0 1-2
4168,967 4143,761 4120,992 4120,815 4026,359	$\begin{array}{c} 3 \\ 10 \\ 7 \\ 60 \\ 25 \end{array}$	21,22 21,22 20,96 20,96 20,96	24,19 24,21 23,97 23,97 24,04	$\begin{array}{c} 2p \ ^{1}P^{\circ} - 6s \ ^{1}S \\ 2p \ ^{1}P^{\circ} - 6d \ ^{1}D \\ 2p \ ^{3}P^{\circ} - 5s \ ^{3}S \\ 2p \ ^{3}P^{\circ} - 5s \ ^{3}S \\ 2p \ ^{3}P^{\circ} - 5d \ ^{3}D \end{array}$	1-0 1-2 0-1 2, 1-1 0-1
4026,1912 4023,973 4009,268 ~3964,7289 3935,912	2 5	20,96 21,22 21,22 20,61 21,22	24,04 24,30 24,31 23,74 24,37	$\begin{array}{c} 2p\ ^{3}P^{\circ}-5d\ ^{3}D \\ 2p\ ^{1}P^{\circ}-7s\ ^{1}S \\ 2p\ ^{1}P^{\circ}-7d\ ^{1}D \\ 2s\ ^{1}S-4p\ ^{1}P^{\circ} \\ 2p\ ^{1}P^{\circ}-8s\ ^{1}S \end{array}$	2, 1-3, 2, 1 1-0 1-2 0-1 1-0
3926 ,534 3888 ,648 3878 ,181 3871 ,791 3867 ,630	7 5000 3 5 5	21,22 19,82 21,22 21,22 20,96	24,37 23,01 24,41 24,42 24,17	$\begin{array}{c} 2p ^{1}P^{\circ} - 8d ^{1}D \\ 2s ^{3}S - 3p ^{3}P^{\circ} \\ 2p ^{1}P^{\circ} - 9s ^{1}S \\ 2p ^{1}P^{\circ} - 9d ^{1}D \\ 2p ^{3}P^{\circ} - 6s ^{3}S \end{array}$	$ \begin{array}{c} 1-2 \\ 1-2, 1, 0 \\ 1-0 \\ 1-2 \\ 0-1 \end{array} $
3867 ,475 3838 ,100 3833 ,554 3819 ,758 3819 ,6072	30 2 4 10 100	20,96 21,22 21,22 20,96 20,96	24 ,17 24 ,45 24 ,45 24 ,21 24 ,21	$\begin{array}{c} 2p \ ^{3}P^{\circ}-6s \ ^{3}S \\ 2p \ ^{1}P^{\circ}-10s \ ^{1}S \\ 2p \ ^{1}P^{\circ}-10d \ ^{1}D \\ 2p \ ^{3}P^{\circ}-6d \ ^{3}D \\ 2p \ ^{3}P^{\circ}-6d \ ^{3}D \end{array}$	$\begin{array}{c} 2, & 1-1 \\ & 1-0 \\ & 1-2 \\ & 0-1 \\ 2, & 1-3, & 2, & 1 \end{array}$
3805,740 3784,862 3768,784 3756,107 3733,010	3 2 2 1 3	21 ,22 21 ,22 21 ,22 21 ,22 20 ,96	24,47 24,49 24,51 24,52 24,28	$\begin{array}{c} 2p \ ^{1}P^{\circ} - 11d \ ^{1}D \\ 2p \ ^{1}P^{\circ} - 12d \ ^{1}D \\ 2p \ ^{1}P^{\circ} - 13d \ ^{1}D \\ 2p \ ^{1}P^{\circ} - 14d \ ^{1}D \\ 2p \ ^{3}P^{\circ} - 7s \ ^{3}S \end{array}$	$ \begin{array}{r} 1 - 2 \\ 1 - 2 \\ 1 - 2 \\ 1 - 2 \\ 0 - 1 \end{array} $
3732,865 3705,148 3705,005 3652,130 3651,990	10 3 30 2 7	20,96 20,96 20,96 20,96 20,96	24,28 24,31 24,31 24,36 24,36	$2p \ ^{3}P^{\circ} - 7s \ ^{3}S$ $2p \ ^{3}P^{\circ} - 7d \ ^{3}D$ $2p \ ^{3}P^{\circ} - 7d \ ^{3}D$ $2p \ ^{3}P^{\circ} - 8s \ ^{3}S$ $2p \ ^{3}P^{\circ} - 8s \ ^{3}S$	2, 1—1 0—1 2, 1—3, 2, 1 0—1 2, 1—1
3634,369 3634,232 3613,643 3599,448 3599,314	2 15 30 2 5	20,96 20,96 20,61 20,96 20,96	24 ,37 24 ,37 24 ,04 24 ,41 24 ,41	$\begin{array}{c} 2p\ ^{3}P^{\circ}-8d\ ^{3}D \\ 2p\ ^{3}P^{\circ}-8d\ ^{3}D \\ 2s\ ^{1}S-5p\ ^{1}P^{\circ} \\ 2p\ ^{3}P^{\circ}-9s\ ^{3}S \\ 2p\ ^{3}P^{\circ}-9s\ ^{3}S \end{array}$	$ \begin{array}{c} 0-1 \\ 2, 1-3, 2, 1 \\ 0-1 \\ 0-1 \\ 2, 1-1 \end{array} $
3587,405 3587,270 3562,979 3554,547 3554,415	2 10 4 1 7	20,96 20,96 20,96 20,96 20,96	24,42 24,42 24,44 24,45 24,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 0-1 \\ 2, 1-3, 2, 1 \\ 2, 1, 0-1 \\ 0-1 \\ 2, 1-3, 2, 1 \end{array}$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
3536 ,809 3530 ,491 3517 ,317 3512 ,512 3502 ,379	3 5 2 4 2	20,96 20,96 20,96 20,96 20,96	24,47 24,47 24,49 24,49 24,50	$\begin{array}{c} 2p\ ^{3}P^{\circ}-11d\ ^{3}S \\ 2p\ ^{3}P^{\circ}-11d\ ^{3}D \\ 2p\ ^{3}P^{\circ}-12d\ ^{3}S \\ 2p\ ^{3}P^{\circ}-12d\ ^{3}D \\ 2p\ ^{3}P^{\circ}-13s\ ^{3}S \end{array}$	2, 1, 0—1 2, 1, 0—3, 2, 1 2, 1, 0—1 2, 1, 0—3, 2, 1 2, 1, 0—1
3498 ,645 3490 ,685 3487 ,723 3478 ,957 3471 ,818	3 2 2 2 1	20,96 20,96 20,96 20,96 20,96	24,51 24,51 24,52 24,53 24,53	$\begin{array}{c} 2p \ ^{3}P^{\circ}-13d \ ^{3}D \\ 2p \ ^{3}P^{\circ}-14s \ ^{3}S \\ 2p \ ^{3}P^{\circ}-14d \ ^{3}D \\ 2p \ ^{3}P^{\circ}-15d \ ^{3}D \\ 2p \ ^{3}P^{\circ}-16d \ ^{3}D \end{array}$	2, 1, 0—3, 2, 1 2, 1, 0—1 2, 1, 0—3, 2, 1 2, 1, 0—3, 2, 1 2, 1, 0—3, 2, 1
3447,586 3354,550 3296,773 3258,275 3231,266	15 10 7 5 3	20,61 20,61 20,61 20,61 20,61	24,21 24,31 24,37 24,42 24,45	$2s {}^{1}S - 6p {}^{1}P^{\circ} \ 2s {}^{1}S - 7p {}^{1}P^{\circ} \ 2s {}^{1}S - 8p {}^{1}P^{\circ} \ 2s {}^{1}S - 9p {}^{1}P^{\circ} \ 2s {}^{1}S - 10p {}^{1}P^{\circ} \ $	0-1 0-1 0-1 0-1 0-1
3211 ,568 3196 ,742 3187 ,745 2945 ,106 2829 ,076	2 200 100 40	20,61 20,61 19,82 19,82 19,82	24,47 24,49 23,71 24,03 24,20	$2s {}^{1}S - 11p {}^{1}P^{\circ}$ $2s {}^{1}S - 12p {}^{1}P^{\circ}$ $2s {}^{3}S - 4p {}^{3}P^{\circ}$ $2s {}^{3}S - 5p {}^{3}P^{\circ}$ $2s {}^{3}S - 6p {}^{3}P^{\circ}$	0-1 $0-1$ $1-2$, 1, 0 $1-2$, 1, 0 $1-2$, 1, 0
2763 ,804 2723 ,191 2696 ,119 2677 ,135 2663 ,271	20 10 7 5 4	19,82 19,82 19,82 19,82 19,82	24,30 24,37 24,42 24,45 24,47	$2s {}^{3}S - 7p {}^{3}P^{\circ}$ $2s {}^{3}S - 8p {}^{3}P^{\circ}$ $2s {}^{3}S - 9p {}^{3}P^{\circ}$ $2s {}^{3}S - 10p {}^{3}P^{\circ}$ $2s {}^{3}S - 11p {}^{3}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2652 ,848 2644 ,802 601 ,404 591 ,411 584 ,334	7 20	19,82 19,82 0,00 0,00 0,00	24,49 24,50 20,61 20,96 21,22	$\begin{array}{c} 2s \ ^{3}S - 12p \ ^{3}P^{\circ} \\ 2s \ ^{3}S - 13p \ ^{3}P^{\circ} \\ 1s^{2} \ ^{1}S - 2s \ ^{1}S \\ 1s^{2} \ ^{1}S - 2p \ ^{3}P^{\circ} \\ 1s^{3} \ ^{1}S - 2p \ ^{1}P^{\circ} \end{array}$	1-2, 1, 0 1-2, 1, 0 0-0 0-1 0-1
537 ,029 522 ,2126 515 ,616 512 ,098 509 ,997	8 80 5 50 2 35	00,00 00,00 00,00 00,00	23,09 23,74 24,04 24,21 24,31	$1s^{2} ext{ }^{1}S - 3p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 4p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 5p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 6p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 7p ext{ }^{1}P^{\circ}$	0—1 0—1 0—1 0—1 0—1
508 ,643 507 ,7173 507 ,0570 506 ,570 506 ,200	8 15 6 10 2 7	00,00 00,00 00,00 00,00	24,37 24,42 24,45 24,47 24,49	$1s^{2} ext{ }^{1}S - 8p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 9p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 10p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 11p ext{ }^{1}P^{\circ}$ $1s^{2} ext{ }^{1}S - 12p ext{ }^{1}P^{\circ}$	0-1 0-1 0-1 0-1 0-1
505 ,912 505 ,684 320 ,392	0 3	0,00 0,00 20,96	24 ,51 24 ,52 59 ,66	$1s^{2} ext{ }^{1}S - 13p ext{ }^{1}P^{\circ}$ $1s^{3} ext{ }^{1}S - 14p ext{ }^{1}P^{\circ}$ $1s^{2}p ext{ }^{3}P^{\circ} - 2p^{2} ext{ }^{3}P$	$ \begin{array}{c} 0-1 \\ 0-1 \\ 2, 1, 0-2, 1, 0 \end{array} $

He II, ground state $1s^{-2}S_{1/2}$ Ionization potential 438908,670 cm⁻¹; 54,414 eV

λ, Α	I	E II. eV	EB, eV	Transition	J
11626,40	-	52 ,24	53,30	$5g^{2}G-7h^{2}H^{\circ}$ etc.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
10123,61	-	51 ,01	52,24	$4f^{2}F^{\circ}-5g^{2}G$ etc.	
9344,93	-	52 ,24	53,56	$5g^{2}G-8h^{2}H^{\circ}$ etc.	
8236,77	-	52 ,24	53,74	$5g^{2}G-9h^{2}H^{\circ}$ etc.	
7592,74	-	52 ,24	53,87	$5g^{2}G-10h^{2}H^{\circ}$ etc.	

λ, Α	I	E _H , eV	E _B . eV	Transition	J
7177,50 6890,88 6683,26 6560,099 6527,16	100	52,24 52,24 52,24 51,01 52,24	53,96 54,04 54,09 52,90 54,14	$5g^{2}G$ — $11h^{2}H^{\circ}$ etc. $5g^{2}G$ — $12h^{2}H^{\circ}$ etc. $5g^{2}G$ — $13h^{2}H^{\circ}$ etc. $4f^{2}F^{\circ}$ — $6g^{2}G$ etc. $5g^{2}G$ — $14h^{2}H^{\circ}$ etc.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
6406,44 6310,8 6233,8 6170,6 5694,46	 	52,24 52,24 52,24 52,24 52,24	54 ,17 54 ,20 54 ,23 54 ,25 54 ,41	$5g^{2}G-15h^{2}H^{\circ}$ etc. $5g^{2}G-16h^{2}H^{\circ}$ etc. $5g^{2}G-17h^{2}H^{\circ}$ etc. $5g^{2}G-18h^{2}H^{\circ}$ etc. Limit of series	9/2, $7/2$ — $11/2$, $9/29/2$, $7/2$ — $11/2$, $9/29/2$, $7/2$ — $11/2$, $9/29/2$, $7/2$ — $11/2$, $9/2$
5411 ,524 4859 ,323 4685 ,682 4541 ,59 4338 ,67	50 7 300 5 3	51,01 51,01 48,37 51,01 51,01	53,30 53,56 51,01 53,74 53,87	$4f {}^{2}F^{\circ} - 7g {}^{2}G$ etc. $4f {}^{2}F^{\circ} - 8g {}^{2}G$ etc. $3d {}^{2}D - 4f {}^{2}F^{\circ}$ etc. $4f {}^{2}F^{\circ} - 9g {}^{2}G$ etc. $4f {}^{3}F^{\circ} - 10g {}^{2}G$ etc.	7/2, $5/2$ — $9/2$, $7/27/2$, $5/2$ — $9/2$, $7/25/2$, $3/2$ — $7/2$, $5/2For all the transitions indicated of this series$
4199 ,87 4100 ,04 4025 ,60 3968 ,43 3644 ,47	2 2 - -	51 ,01 51 ,01 51 ,01 51 ,01 51 ,01	53 ,96 54 ,04 54 ,09 54 ,14 54 ,41	$4f {}^{2}F^{\circ}$ — $11g {}^{2}G$ etc. $4f {}^{2}F^{\circ}$ — $12g {}^{2}G$ etc. $4f {}^{2}F^{\circ}$ — $13g {}^{2}G$ etc. $4f {}^{2}F^{\circ}$ — $14g {}^{2}G$ etc. Limit of series	⁷ / ₂ , ⁵ / ₂ — ⁹ / ₂ , ⁷ / ₂
3203 ,104 2733 ,32 2511 ,22 2385 ,42 2306 ,22	200 100 50 30 20	48,37 48,37 48,37 48,37 48,37	52,24 52,90 53,30 53,56 53,74	$3d^{2}D-5f^{2}F^{\circ}$ etc. $3d^{2}D-6f^{2}F^{\circ}$ etc. $3d^{2}D-7f^{2}F^{\circ}$ etc. $3d^{2}D-8f^{2}F^{\circ}$ etc. $3d^{2}D-9f^{2}F^{\circ}$ etc.	For all the transitions indicated of this series $^{5}/_{2}$, $^{3}/_{2}$ — $^{7}/_{2}$, $^{5}/_{2}$
2252 ,71 2214 ,67 2186 ,61 2165 ,24 2049 ,94	10 6 4 2	48,37 48,37 48,37 48,37 48,37	53,87 53,96 54,04 54,09 54,41	$3d^{2}D-10f^{2}F^{\circ}$ etc. $3d^{2}D-11f^{2}F^{\circ}$ etc. $3d^{2}D-12f^{2}F^{\circ}$ etc. $3d^{2}D-13f^{2}F^{\circ}$ etc. Limit of series	
1640,490 1640,474 1640,332 1215,171 1215,088	1 10 5 5 2	40,81 40,81 40,81 40,81 40,81	48,37 48,37 48,37 51,01 51,01	$2p \ ^3P^{\circ} - 3d \ ^2D$ etc. $2p \ ^2P^{\circ} - 3d \ ^2D$ etc. $2p \ ^2P^{\circ} - 3d \ ^2D$ etc. $2p \ ^2P^{\circ} - 4d \ ^2D$ etc. $2p \ ^2P^{\circ} - 4d \ ^2D$ etc.	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$, $3/2$ $1/2 - 3/2$
1084 ,951 1025 ,280 992 ,370 972 ,118 958 ,705	3 2 1 0,7 0,5	40,81 40,81 40,81 40,81 40,81	52,24 52,90 53,30 53,56 53,74	$2p \ ^2P^{\circ} - 5d \ ^2D$ etc. $2p \ ^2P^{\circ} - 6d \ ^2D$ etc. $2p \ ^2P^{\circ} - 7d \ ^2D$ etc. $2p \ ^2P^{\circ} - 8d \ ^2D$ etc. $2p \ ^2P^{\circ} - 9d \ ^2D$ etc.	For all the transitions indicated of this series $\frac{3}{2}$, $\frac{1}{2}$ — $\frac{5}{2}$, $\frac{3}{2}$
949 ,335 942 ,52 937 ,40 933 ,46 911 ,37	0,3 0,2 — —	40,81 40,81 40,81 40,81 40,81	53,87 53,96 54,04 54,09 54,41	$2p ^2P^{\circ}$ — $10d ^2D$ etc. $2p ^2P^{\circ}$ — $11d ^2D$ etc. $2p ^2P^{\circ}$ — $12d ^2D$ etc. $2p ^2P^{\circ}$ — $13d ^2D$ etc. Limit of series	
303 ,783 256 ,317 243 ,027 237 ,331 234 ,347	500 150 7 0 35 20	00, 00 00, 00 00, 00 00, 00	40 ,81 48 ,37 51 ,01 52 ,24 52 ,90	1s ² S-2p ² P° 1s ² S-3p ² P° 1s ² S-4p ² P° 1s ² S-5p ² P° 1s ² S-6p ² P°	For all the transitions of this series $1/2-3/2$, $1/2$
232 ,584 231 ,454 230 ,686 230 ,139 229 ,736	13 8 5 4 3	0,00 0,00 00,00 00,00	53,30 53,56 53,74 53,87 53,96	1s ² S-7p ² P° 1s ² S-8p ² P° 1s ² S-9p ² P° 1s ² S-10p ² P° 1s ² S-11p ² P°	
229 ,431 227 ,83	<u>2</u>	0,00 0,00	54 ,04 54 ,41	1s 2S —12 p 2P ° Limit of series	

LITHIUM, Z = 3

Li I, ground state $1s^2 2s {}^2S_{1/2}$ Ionization potential 43487,19 cm⁻¹; 5,391 eV

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
26877,82	8	3,37	3,83	$3s^2S - 3p^2P^{\circ}$	1/ _ 3/ 1/
24464,66	6	3,83	4,34	$3p^{2}P^{\circ} - 4s^{2}S$	$\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$ $\frac{3}{2}, \frac{1}{2} - \frac{1}{2}$
19274,78	4	3,88	4,52	$3p^{2}P = 48^{\circ}3$ $3d^{2}D = 4p^{2}P^{\circ}$	$\frac{7}{2}$, $\frac{7}{2} - \frac{7}{2}$ $\frac{5}{2}$, $\frac{3}{2} - \frac{1}{2}$
18703,09	7	3,88	4,54	$3d^2D - 4f^2F^0$	$\frac{7_2}{5_2}, \frac{7_2}{3_2} = \frac{7_2}{2}, \frac{5_2}{2}$
17546,05	7	3,83	4,54	$3p^{2}P^{\circ} - 4d^{2}D$	$\frac{7_{2}}{3}, \frac{7_{2}}{1/2} - \frac{7_{2}}{5/2}, \frac{7_{2}}{3/2}$
13557,75	4	3,83	4,75	$3p^{2}P^{\circ} - 5s^{2}S$	$\frac{1}{3}$, $\frac{1}{2}$ $\frac{1}{2}$, $\frac{1}{2}$
12793,31	5	3,88	4,85	$3d^2D - 5f^2F^{\circ}$	$\frac{72}{5}$, $\frac{72}{3}$ = $\frac{72}{2}$, $\frac{5}{2}$
12237,67	4	3,83	4,85	$3p^{2}P^{\circ} - 5d^{2}D$	$\frac{72}{3}$, $\frac{72}{1/2}$ $-\frac{72}{5/2}$, $\frac{72}{3/2}$
11032,09	1	3,83	4,96	$3p^{2}P^{\circ}-6s^{2}S$	$\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{2}$
10976,06	0	3,88	5,01	$3d^2D - 6p^2P^0$	$\frac{5}{2}$, $\frac{72}{3}$, $\frac{72}{2}$, $\frac{72}{2}$, $\frac{1}{2}$
	3			$3d^2D - 6f^2F^{\circ}$	$\frac{72}{5/2}$, $\frac{3}{2}$ = $\frac{72}{7/2}$, $\frac{5}{2}$
10919,07 10510,60		3,88	5,01	$3p^{2}P^{\circ}-6d^{2}D$	
	3	3,83	5,01	$3p P = 0a D$ $3d^2D = 7f^2F^0$	$\frac{3}{2}$, $\frac{1}{2} - \frac{5}{2}$, $\frac{3}{2}$
10032,81 9955,09	2 2	3,88	5,11 5,08	$3p^{2}P^{\circ}-7s^{2}S$	$\frac{5}{2}$, $\frac{3}{2}$ - $\frac{7}{2}$, $\frac{5}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ - $\frac{1}{2}$
	2	3,83 3,83	5,08 5,11	$3p^{2}P^{\circ} - 7d^{2}D$	$\frac{7}{2}$, $\frac{7}{2} = \frac{7}{2}$ $\frac{3}{2}$, $\frac{1}{2} = \frac{5}{2}$, $\frac{3}{2}$
9686,37	1			$3d^2D - 8f^2F^{\circ}$	
9530,73		3,88	5, 18	$3p^{2}P^{\circ} - 8s^{2}S$	$\frac{5}{2}$, $\frac{3}{2} - \frac{7}{2}$, $\frac{5}{2}$
9376,71 9217,32	1 2	3,83	5,16	$3p^{2}P^{\circ} - 8d^{2}D$	$\frac{3}{2}$, $\frac{1}{2} - \frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2} - \frac{5}{2}$, $\frac{3}{2}$
		3,83	5,18		•
9214,61	1	3,88	5,22	$3d^2D - 9f^2F^0$	$\frac{5}{2}$, $\frac{3}{2} - \frac{7}{2}$, $\frac{5}{2}$
8921,14	0	3.83	5,22	$3p^{2}P^{\circ} - 9d^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$ - $\frac{5}{2}$, $\frac{3}{2}$
8465,352	4	3,37	4,84	$3s^2S - 5p^2P^\circ$ $2p^2P^\circ - 3s^2S$	$\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$
8126,378	300	1,85	3,37		$\frac{3}{2}$, $\frac{1}{2} - \frac{1}{2}$
7582,169	3	3,37	5,01	$3s^2S - 6p^2P^0$	$\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$
7135,040	1	3,37	5,11	$3s^2S - 7p^2P^0$	$\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$
6707,807 6240,4	${}^{1000}_2$	0,00 1,85	1 ,85 3 ,83	$\frac{2s}{2p} \frac{^2S}{^2P} \stackrel{^{\circ}}{-} 3p \frac{^2P}{^2P} \stackrel{^{\circ}}{-}$	$\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
6103,61	500	1,85	3,88	$2p ^{2}P^{\circ} - 3d ^{2}D$	
4971,720	50	1,85	4,34	$2p^{2}P^{\circ}-4s^{2}S$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$
4636 ,0	1	1 ,85	4,52	$2p ^{2}P^{\circ} - 4p ^{2}P^{\circ}$	$^{3}/_{2}, ^{1}/_{2}$ — $^{3}/_{2}, ^{1}/_{2}$
4602,871	100	1,85	4 ,54	$2p^{2}P^{\circ}-4d^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4602,02	1	1,85	4,54	$2p^{3}P^{\circ}$ —4 $f^{2}F$	
4273,107	10	1,85 1,85	4,75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
4148 ,4 4132 ,598	- 50	1 ,85 1 ,85	4,84 4,85	$\frac{2p}{2p} {}^{1}P^{\circ} - 5d {}^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{3}{2}$, $\frac{3}{2}$ $\frac{5}{2}$, $\frac{3}{2}$
3985,520	5	1,85	4,96	$2p^{2}P^{\circ}-6s^{2}S$	$^{3}/_{2}, ^{1}/_{2}-^{1}/_{2}$
3921 ,6	_	1 ,85	5 ,01	$2p^{2}P^{\circ}-6p^{2}P^{\circ}$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
3915,329	$\frac{25}{2}$	1,85	5,01	$2\hat{p} {}^{2}P^{\circ} - 6\hat{d} {}^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$
3838 ,15	3 10	1,85 1,85	5,08 5,11	$2p^{2}P^{\circ}-7s^{2}S = 2p^{2}P^{\circ}-7d^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$, $\frac{1}{2}$
3794 ,72 3 7 18 ,7	5	1,85	5,18	$\frac{2p}{2p} {}^{2}P^{\circ} - 8d {}^{2}D$	3/2, $1/2$ $5/2$, $3/2$
3670,4	$\ddot{3}$	1,85	5,22	$2p^{2}P^{\circ}-9d^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$
3232 ,634	50	0,00	3,83	$2s$ 2S — $3p$ 2P $^\circ$	$^{1}/_{2}$ — $^{3}/_{2}$, $^{1}/_{2}$
3195,6	3	0,00	3,88	$2s^2S-3d^2D$	$\frac{1}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$, $\frac{1}{2}$
2741,186	10	00,0	4,52	$2s^{2}S - 4p^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
2732,3	2 5	0,00	4,54	$\frac{2s}{2s} \frac{^2S-4d}{^2P} \frac{^2D}{^2P}$	$^{1/_{2}}_{^{1}/_{2}}^{^{3}/_{2}}$
2562,305 2557,4		00, 0 00, 0	4 ,84 4 ,85	$\frac{2s}{2s} = \frac{3}{5} = \frac{3p}{4} = P$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
2475 ,057	4	0,00	$\frac{4,00}{5,01}$	$2s^2S-6p^2P^c$	$\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
2425,414	3	0,00	5 , 11	$2s {}^2S$ — $7p {}^2P^\circ$	$^{1}/_{2}$ $^{-3}/_{2}$, $^{1}/_{2}$
2394,355	2	00,00	5,18	$2s^{2}S - 8p^{2}P^{\circ}$	$^{1}/_{2}$ $^{-3}/_{2}$, $^{1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$, $^{1}/_{2}$
2373,548	1 1	0,00	5 ,22 5 ,25	$\frac{2s}{2s} \frac{^2S}{^2S} - \frac{9p}{p} \frac{^2P}{^2P}$	$\frac{1}{2} \frac{3}{2}, \frac{1}{2}$ $\frac{1}{2} \frac{3}{2}, \frac{1}{2}$
2358, 917	1	00, 0	., 4.1	23 B = 10p 1	2 121 12

Li II, ground state $1s^{2}$ $^{1}S_{0}$ Ionization potential 610079, cm⁻¹; 75,635 eV

λ, Λ	I	$E_{_{ m H}},{ m eV}$	E _B . eV	Transition	J
9581,42 5484,7 5037,8 4881,3 4788,8 4677,7 4671,8 4325,7 4156,3 3684,1	10 6 3 8 8 4 3 1 3	60,92 59,02 69,64 69,37 69,64 69,59 69,58 69,37 69,28 68,78	62,21 61,28 72,10 71,90 72,23 72,23 72,23 72,23 72,23 72,23 72,24 72,14	$\begin{array}{c} 2s {}^{1}S - 2p {}^{1}P^{\circ} \\ 2s {}^{3}S - 2p {}^{3}P^{\circ} \\ 3p {}^{1}P^{\circ} - 4s {}^{1}S \\ 3p {}^{3}P^{\circ} - 4s {}^{3}S \\ 3p {}^{1}P^{\circ} - 4d {}^{1}D \\ 3d {}^{1}D - 4f {}^{1}F^{\circ} \\ 3d {}^{3}D - 4f {}^{3}F^{\circ} \\ 3p {}^{3}P^{\circ} - 4d {}^{3}D \\ 3s {}^{1}S - 4p {}^{1}P^{\circ} \\ 3s {}^{3}S - 4p {}^{3}P^{\circ} \end{array}$	$0-1 \\ 1-2, 1, 0 \\ 2, 1, 0-1 \\ 1-2 \\ 2-3 \\ 3, 2, 1-4, 3, 2 \\ 2, 1, 0-3, 2, 1 \\ 0-1 \\ 1-2, 1, 0$
3305 ,2 3249 ,8 3199 ,43 3195 ,8 3155 ,4 3029 ,1 2952 ,7 2790 ,39 2767 ,0 2730 ,7	4 5 7 3 2 2,5 0,5 2 4 5	69,64 69,64 69,59 69,58 69,37 69,37 69,28 69,64 69,64 69,59	73,39 73,46 73,46 73,46 73,29 73,46 73,47 74,09 74,12 74,12	$3p ^{1}P^{\circ} - 5s ^{1}S$ $3p ^{1}P^{\circ} - 5d ^{1}D$ $3d ^{1}D - 5f ^{1}F^{\circ}$ $3d ^{3}D - 5f ^{3}F^{\circ}$ $3p ^{3}P^{\circ} - 5s ^{3}S$ $3p ^{3}P^{\circ} - 5d ^{3}D$ $3s ^{1}S - 5p ^{1}P^{\circ}$ $3p ^{1}P^{\circ} - 6s ^{1}S$ $3p ^{1}P^{\circ} - 6d ^{1}D$ $3d ^{1}D - 6f ^{1}F^{\circ}$	1-0 1-2 2-3 3, 2, 1-4, 3, 2 2, 1, 0-1 2, 1, 0-3, 2, 1 0-1 1-0 1-2 2-3
2728,4 2674,4 2657,3 2605,1 2551,7 2539,4 2508,83 2430,0 2410,85 2402,3	2 2 1,5 1,5 1 2 3 1	69,58 68,78 69,37 69,37 69,64 69,59 69,37 69,64 69,37	74,12 73,41 74,03 74,12 74,50 74,52 74,53 74,47 74,78 74,52	$3d\ ^3D-6f\ ^3F^\circ$ $3s\ ^3S-5p\ ^3P^\circ$ $3p\ ^3P^\circ-6s\ ^3S$ $3p\ ^3P^\circ-6d\ ^3D$ $3p\ ^1P^\circ-7s\ ^1S$ $3p\ ^1P^\circ-7d\ ^1D$ $3d\ ^1D-7f\ ^1F^\circ$ $3p\ ^3P^\circ-7s\ ^3S$ $3p\ ^1P^\circ-8d\ ^1D$ $3p\ ^3P^\circ-7d\ ^3D$	3, 2, 1-4, 3, 2 1-2, 1, 0 2, 1, 0-1 2, 1, 0-3, 2, 1 1-0 1-2 2-3 2, 1, 0-1 1-2 2, 1, 0-3, 2, 1
2383,26 2330,0 1756,0 1682,4 1653,9 1493,7 1420,89 1254,6 1198,6 1167,0	2 1 5 4 8 6 1 1 7 2	69,59 68,78 62,21 62,21 61,28 61,28 60,92 62,21 59,02 61,28	74,79 74,10 69,28 69,59 68,78 69,58 69,64 72,10 69,37 71,90	$\begin{array}{c} 3d\ ^{1}D-8f\ ^{1}F^{\circ} \\ 3s\ ^{3}S-6p\ ^{3}P^{\circ} \\ 2p\ ^{1}P^{\circ}-3s\ ^{1}S \\ 2p\ ^{1}P^{\circ}-3d\ ^{1}D \\ 2p\ ^{3}P^{\circ}-3s\ ^{3}S \\ 2p\ ^{3}P^{\circ}-3d\ ^{3}D \\ 2s\ ^{1}S-3p\ ^{1}P^{\circ} \\ 2p\ ^{1}P^{\circ}-4s\ ^{1}S \\ 2s\ ^{3}S-3p\ ^{3}P^{\circ} \\ 2p\ ^{3}P^{\circ}-4s\ ^{3}S \end{array}$	$\begin{array}{c} 2-3 \\ 1-2, 1, 0 \\ 1-0 \\ 1-2 \\ 2, 1, 0-1 \\ 2, 1, 0-3, 2, 1 \\ 0-1 \\ 1-0 \\ 1-2, 1, 0 \\ 2, 1, 0-1 \end{array}$
1132 ,8 199 ,282 178 ,015 171 ,582 168 ,741	1 3 1 1 —	61,28 0,00 0,00 0,00 0,00 0,00	72,23 62,21 69,64 72,26 73,47	$2p \ ^{3}P^{\circ}-4d \ ^{3}D$ $1s^{2} \ ^{1}S-2p \ ^{1}P^{\circ}$ $1s^{2} \ ^{1}S-3p \ ^{1}P^{\circ}$ $1s^{2} \ ^{1}S-4p \ ^{1}P^{\circ}$ $1s^{2} \ ^{1}S-5p \ ^{1}P^{\circ}$	2, 1, 0-3, 2, 1 0-1 0-1 0-1 0-1

Li III, ground state 1s $^2S_{1/2}$ Ionization potential $987657.8~\rm{cm}^{-1}$; $122,446~\rm{eV}$

λ, Å	I	E _H . eV	E_{B} , eV	Transition	J
729 ,1 540 ,0		91 ,94 91 ,94	108 ,84 114 ,79	2p ² P°-3d ² D 2p ² P°-3d ² D	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{5}{2}$, $\frac{3}{2}$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
482 ,1 455 ,6 441 ,0	_ _ 	91 ,94 91 ,94 91 ,94	117 ,55 119 ,05 119 ,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$, $\frac{1}{2}$ — $\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ — $\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ — $\frac{5}{2}$, $\frac{3}{2}$
135,02 113,93 108,01 105,49 104,17	 	00, 00 00, 00 00, 00 00, 0	91,94 108,84 114,79 117,55 119,05	$1s^{2}S - 2p^{2}P^{\circ}$ $1s^{2}S - 3p^{2}P^{\circ}$ $1s^{2}S - 4p^{3}P^{\circ}$ $1s^{2}S - 5p^{2}P^{\circ}$ $1s^{2}S - 6p^{2}P^{\circ}$	$\begin{array}{c} 1/_{2} - 3/_{2}, \ 1/_{2} \\ 1/_{2} - 3/_{2}, \ 1/_{2} \\ 1/_{2} - 3/_{2}, \ 1/_{2} \\ 1/_{2} - 3/_{2}, \ 1/_{2} \\ 1/_{2} - 3/_{2}, \ 1/_{2} \\ 1/_{2} - 3/_{2}, \ 1/_{2} \end{array}$
103 ,40 102 ,86		00,00 00,00	119 ,95 120 ,53	1s ² S - 7p ² P° 1s ² S - 8p ² P°	$\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$

CARBON, Z = 6

C I, ground state $1s^2$ $2 s^2$ $2p^2$ 3P_0 Ionization potential 90820,42 cm⁻¹; 11,269 eV

			1		
λ., Α	<i>I</i>	E _H , eV	E _B . eV	Transition	J
25842 , 20	1	8,85	9,33	$3p^{3}P - 2p^{3}^{3}P^{\circ}$	2 – 1
25833,66	1	8,85	9,33	$3p^{3}P - 2p^{3}^{3}P^{\circ}$	2 - 2
25706,03	1	8,85	9,33	$3p^{3}P - 2p^{3}{}^{3}P^{\circ}$	1-1
25697,56	1	8,85	9,33	$3p^{3}P - 2p^{3}{}^{3}P^{\circ}$	1 - 2
22906,56	7	9,17	9,71	$3p^{1}S - 4s^{1}P^{\circ}$	0 - 1
21295,27	1	9,83	10,42	$3d^3P^0 - 4\int D(2^{1/2})$	1 - 2
21259,89	8	9,83	10,42	$3d^3P^0 - 4fD(2^{1/2})$	2 - 3, 2
21211,55	2	9,83	10,42	$3d^3P^\circ - 4fD(1^{1/2})$	0 - 1
21191,41	4	9,83	10,42	$3d^3P^0 - 4fD(1^{1/2})$	1 - 2, 1
21023,13	8	9,17	9,76	$3p^{1}S - 3d^{1}P^{0}$	0 - 1
19721,99	23	9,00	9,63	$3p^{1}D - 3d^{1}D^{\circ}$	1 – 2
18926.54	3	9,76	10,42	$3d^{1}P^{\circ} - 4fD(2^{\frac{1}{2}})$	1 - 2
18844,42	2	9,76	10,42	$3d^{1}P^{\circ} - 4fD(1^{1/2})$	1 - 2, 1
18320,67	8	9,74	10,42	$3d^{1}F^{\circ} - 4fG(3^{1/2})$	3-4, 3
18221,12	8	9,74	10,42	$3d^{1}F^{\circ} - 4fG(4^{1/2})$	3 – 4
18139,80	13	8,65	9,33	$3p^{3}D - 2p^{3}{}^{3}P^{\circ}$	3 - 2
18034,86	5	8,64	9,33	$3p^{3}D - 2p^{3} {}^{3}P^{\circ}$	2 – 1
18030,47	2	8,64	9,33	$3p^{3}D - 2p^{3} {}^{3}P^{\circ}$	2 - 2
17966,12	2	8,64	9,33	$3p^{3}D - 2p^{3} P^{\circ}$	1 - 1
17959,24	3	8,64	9,33	$3p^{3}D - 2p^{3} P^{\circ}$	1 – 0
17918,38	4	9,33	10,02	$2p^{3} {}^{3}P^{\circ} - 4p {}^{3}D$	2 - 3
17826,33	4	9 , 71	10,41	$3d^3D^\circ - 4fF(3^{1/2})$	3-4, 3
			10,41	$3d^3D^0 - 4f F(2^{1/2})$	2-3, 2
17814,03	3	9,71		$3d^3D^\circ - 4\int F(2^{1/2})$	1-2
17768,94	3	9,71	10,41	$3d^{3}D^{\circ} - 4fG(3\frac{1}{2})$ $3d^{3}D^{\circ} - 4fG(3\frac{1}{2})$	3-4, 3
17637,38	3 3	9,71	10,42	$3d^{3}F^{\circ} - 4fG(3\frac{1}{2})$ $3d^{3}F^{\circ} - 4fG(3\frac{1}{2})$	3-4, 3
17505,64 17455,97	2	9,70 9,70	10,41 10,41	$3d^{3}F^{\circ} - 4fF(3^{1/2})$	2 – 3
17448,60	11	9,00	9,71	$3p^{1}D - 4s^{1}P^{\circ}$	2 - 1
	10	9 , 70	10,42	$3d^3F^0 - 4fG(4^{1/2})$	4 - 5, 4
17338,56		9 , 70	10,42	$3d^{3}F^{\circ} - 4fG(3^{1/2})$	3-4, 3
17323,51	2	9 , 70	10,42	$3d^{3}F^{\circ} - 4fG(3^{1/2})$	$\frac{3-4}{2-3}$
17274,99	3	9 , 70		$3p^{3}F^{\circ} - 4fG(3^{1/2})$	3 – 4
17234,48	2	9,00	10,42	$3d^{1}D - 3d^{1}F^{\circ}$	$\frac{3-4}{2-3}$
16890,38	50		9,74	$3d^{1}D^{\circ} - 4f F(2^{1/2})$	2-3, 2
16021,64	3	9 , 63	10,41	$3d^{1}D^{\circ} - 4fF(2^{1/2})$ $3d^{1}D^{\circ} - 4fF(3^{1/2})$	2 - 3, 2 2 - 3
16004,81	2	9,63	10,41	$3p^{3}P - 4s^{3}P^{\circ}$	2 - 3 2 - 2
14782,98	4	8,85	9,69	$3p^{3}P - 4s^{2}P$ $3p^{3}P - 3d^{3}F^{\circ}$	2 - 2 $2 - 3$
14637,03	2	8,85	9,70	$3s {}^{1}P^{\circ} - 3p {}^{1}P$	1-1
14542,50	179	7,68	8,54	$3s P - 3p P$ $3p^{3}P - 3d^{3}D^{\circ}$	$\frac{1-1}{2-2}$
14442,24	13	8,85	9,71	3p P - 3d D	
14429,03	12	8,85	9,71	$3p^{3}P - 3d^{3}D^{\circ}$	1-1
14420.12	61	8,85	9,71	$3p^{3}P - 3d^{3}D^{\circ}$	2 - 3
14403,25	16	8,85	9,71	$3p^{3}P - 3d^{3}D^{\circ}$	0 - 1
14399,65	38	8,85	9,71	$3p^{3}P - 3d^{3}D^{\circ}$	1 - 2
13765,29	1	7 , 95	8,85	$2p^{33}D^{\circ} - 3p^{3}P$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \end{array} $
13743,93	3	7 , 95	8,85	$2p^{3} {}^{3}D^{\circ} - 3p^{3}P$	2 - 1 1 - 1
13741,86	1	7,95	8,85	$2p^{3} D^{\circ} - 3p^{3} P$	1 - 1 $2 - 2$
13705,41	1	7,95	8,85	$2p^{3} D^{\circ} - 3p^{3}P$	
13697,81	6	7 , 95	8,85	$2p^{3} {}^{3}D^{\circ} - 3p^{3}P$	3 - 2
13581,35	5	8,77	9,68	$3p^{3}S - 4s^{3}P^{\circ}$	1-0
13559,66	12	8,77	9,68	$3p^3S - 4s^3P^\circ$	1 1

λ, Å	I	E _H , eV	E _B , eV	Transition	J
13502,27	20	8 , 77	9,69	$3p^3S - 4s^3P^{\circ}$	1 – 2
12614,10	26	8,65	9,83	$3p^3P - 3d^3P^\circ$	2 – 2
12601,48	8	8,85	9,83	$3p^3P - 3d^3P^{\circ}$	$\frac{1}{2} - \frac{1}{1}$
12581,59	6	8,85	9,83	$3p^{3}P - 3d^{3}P^{\circ}$	1 - 2
12569,04	5	8,85	9,83	$3p^{3}P - 3d^{3}P^{\circ}$	1-1
12562,12	6	8,85	9,83	$3p^3P - 3d^3P^{\circ}$	1-0
12549,48	5	8,85	9,83	$3p^{3}P - 3d^{3}P^{\circ}$	0 – 1
11895,75	30	8,65	9,69	$3p^3D - 4s^3P^0$	3-2
11892,91	17	8,64	9,68	$3p^{3}D - 4s^{3}P^{\circ}$	2 - 1
11879,59	8	8,64	9,68	$3p^{3}D - 4s^{3}P^{\circ}$	1-0
11862,99	5	8,64	9,68	$3p^{3}D - 4s^{3}P^{\circ}$	1 – 1
11848,73	6	8,64	9,69	$3p^3D - 4s^3P^{\circ}$	1 – 2
11801,08	7	8,65	9,70	$3p^3D - 3d^3F^\circ$	3 – 3
11777,54	11	8,64	9,69	$3p^3D - 3d^3F^{\circ}$	2 - 2
11754,76	114	8,64	9,70	$3p^3D-3d^3F^{\circ}$	2 – 3
11753,32	142	8,65	9 , 70	$3p^3D-3d^3F^{\circ}$	3 – 4
11748,22	82	8,64	9,69	$3p^3D - 3d^3F^{\circ}$	1 - 2
11674,14	7	8,65	9,71	$3p^{3}D - 3d^{3}D^{\circ}$	3 - 2
11669,63	24	8,77	9,83	$3p^3S - 3d^3P^0$	1 - 2
11659,68	47	8,65	9,71	$3p^3D - 3d^3D^{\circ}$	3 – 3
11658,85	13	8,77	9,83	$3p^3S - 3d^3P^{\circ}$	1 — 1
11652,91	5	8,77	9,83	$3p^3S - 3d^3P^{\circ}$	1 - 0
11647,99	5	8,64	9,71	$3p^{3}D - 3d^{3}D^{\circ}$	2 – 1
11628,83	23	8,64	9,71	$3p^3D - 3d^3D^{\circ}$	2 – 2
11619,29	12	8,64	9,71	$3p^3D - 3d^3D^0$	1 – 1
11330,285	6	8,54	9,63	$3p^{1}P - 3d^{1}D^{\circ}$	1 – 2
10753,985	2	7,49	8,64	$3s^{3}P^{\circ} - 3p^{3}D$	2 – 1
10729,533	6	7,49	8,64	$3s^{3}P^{\circ} - 3p^{3}D$	2 – 2
10707,333	6	7,48	8,64	$3s^{3}P^{\circ} - 3p^{3}D$	1 — 1
10691,250	10	7,49	8,65	$3s^{3}P^{\circ} - 3p^{3}D$	2 – 3
10685,345	6	7,48	8,64	$3s^{3}P^{\circ} - 3p^{3}D$	0 - 1
10683,082	8	7,48	8,64	$3s^{3}P^{\circ} - 3p^{3}D$	1 – 2
10541,226	4	8,54	9,71	$3p^{1}P - 4s^{1}P^{\circ}$	1 – 1
10123,871 9658,44	6 10	8,54 7,40	9 , 76	$3p^{1}P - 3d^{1}P^{\circ}$	1 – 1
9620 ,80	9	7 ,49 7 ,48	8 ,77 8 ,77	$\frac{3s}{3}P^{\circ} - \frac{3p}{3}S$ $\frac{3s}{3}P^{\circ} - \frac{3p}{3}S$	2-1
9603,03	7	7,48	8,77	$3s ^{3}P^{\circ} - 3p ^{3}S$	1—1 0—1
9405 ,73	16	7,68	9,00	$3s {}^{1}P^{\circ} - 3p {}^{1}D$	1-2
9182,83	4	9,00	10,35	$3p {}^{1}\!D - 4d {}^{1}\!D^{\circ}$	2—2
9111,80	10	7,49	8,85	$3s^{3}P^{\circ} - 3p^{3}P$	2—1
9094,83	12	7,49	8,85	$3s ^3P^{\circ} - 3p ^3P$	2—2
9088 ,51 9078 ,28	9 8	7 ,48 7 ,48	8,85	$3s ^3P^{\circ} - 3p ^3P$	1-0
			8,85	$3s ^3P^{\circ} - 3p ^3P$	1—1
9062,47	8 9	7,48	8,85	$3s ^3P^{\circ} - 3p ^3P$	0—1
9061 ,43 8960 ,75	$\frac{3}{2}$	7 ,48 9 ,33	8,85 10,71	$3s {}^{3}P^{\circ} - 3p {}^{3}P \ 2p^{3} {}^{3}P^{\circ} - 5f F (2^{1}/_{2})$	1-2
8904,34	$\tilde{2}$	9,33	10,71	$2p^{3} P - 3f F (2^{3}/2)$ $2p^{3} P^{\circ} - 5f D (2^{1}/2)$	$\begin{array}{c} 2 - 3 \\ 2 - 3 \end{array}$
8903 ,20	1	9 ,33	10,72	$2p^3 \ ^3P^{\circ} - 5f D \ (2^{1/2})$	$\frac{2-3}{1-2}$
8890,67	2	9,33	10,72	$2p^{3} {}^{3}P^{\circ} - 5f D (1^{1}/2)$	
8873 ,39	3	9,00	10,40	$3p ^{1}D - 5s ^{1}P^{\circ}$	1—2 2—1
8753 ,08	3	9 ,00	10 ,42	$3p ^{1}D-4d ^{1}P^{\circ}$	2-1
8536 ,26	1 1	9,33	10,78	$2p^{\frac{3}{3}} {}^{3}P^{\circ} - 6p {}^{3}D$	1—2
3510 ,45	,	9 ,33	10,79	$2p^3 ^3P^{\circ} - 6p ^3D$	2-3
8430 ,88	1	9,33	10,80	$2p^{3} {}^{3}P^{\circ} - 6p {}^{3}P$	2—2
8335,15	13	7,68	9,17	$3s^{1}P^{\circ} - 3p^{1}S$	1— 0
8083 ,80	5	8,85	10,38	$3p ^3P - 5s ^3P^3$	2—1

λ, Ä	I	E _H , eV	E _B , eV	Transition	J
8078 ,48	4	8 ,85	10 ,38	$3p \ ^{3}P - 5s \ ^{3}P^{\circ} \ 3p \ ^{3}P - 5s \ ^{3}P^{\circ}$	1—0
8070 ,42	3	8 ,85	10 ,38		1—1
8062,36	3	8,85	10,38	$3p \ ^{3}P - 5s \ ^{3}P^{\circ}$	0—1
8058,62	8	8,85	10,39	$3p \ ^{3}P - 5s \ ^{3}P^{\circ}$	2—2
8045,33	4	8,85	10,39	$3p \ ^{3}P - 5s \ ^{3}P^{\circ}$	1—2
8021,26	3	8,85	10,40	$3p \ ^{3}P - 4d \ ^{3}D^{\circ}$	2—3
8018,56	1	8,85	10,39	$3p \ ^{3}P - 4d \ ^{3}D^{\circ}$	0—1
7993 ,42	3	9,33	10,88	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 6f F (2^{1}/_{2}) \\ 2p^{3} {}^{3}P^{\circ} - 6f F (2^{1}/_{2}) \\ 3p {}^{1}S - 5d {}^{1}P^{\circ} \\ 2p^{3} {}^{3}P^{\circ} - 6f D (2^{1}/_{2}) \\ 2p^{3} {}^{3}P^{\circ} - 6f D (2^{1}/_{2}) \end{array}$	2-3, 2
7992 ,53	0	9,33	10,88		1-2
7987 ,89	2	9,47	10,72		0-1
7952 ,19	3	9,33	10,89		2-3, 2
7951 ,35	1	9,33	10,89		1-2
7944,60	3	9,33	10,89	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 6f D (\Lambda^{1}/_{2}) \\ 3p {}^{3}P - 4d {}^{3}P^{\circ} \end{array}$	1-2, 1
7860,89	8	8,85	10,43		2-2
7852,86	4	8,85	10,43		2-1
7848,25	4	8,85	10,43		1-2
7840,28	2	8,85	10,43		1-1
7837,11	3	8 ,85	10,43	3p ³ P-4d ³ P°	1—0
7832,63	3	8 ,85	10,43	3p ³ P-4d ³ P°	0—1
7692,50	2	8 ,77	10,38	3p ³ S-5s ³ P°	1—0
7685,20	4	8 ,77	10,38	3p ³ S-5s ³ P°	1—1
7662,43	5	8 ,77	10,39	3p ³ S-5s ³ P°	1—2
7505,67 7483,44 7476,18 7473,30 7470,09	1 3 2 1	9 ,33 8 ,77 8 ,77 8 ,77 9 ,33	10,98 10,43 10,43 10,43 10,99	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 7f F (2^{1}/_{2}) \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \\ 2p^{3} {}^{3}P^{\circ} - 7f D (2^{1}/_{2}) \end{array}$	2-3, 2 1-2 1-1 1-0 2-3, 2
7465,45	1	9,33	10,99	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 7f D (1^{1}/_{2}) \\ 3p {}^{1}D - 5d {}^{1}D^{\circ} \\ 3p {}^{1}D - 6s {}^{3}P^{\circ} \\ 3p {}^{1}D - 6s {}^{1}P^{\circ} \\ 3p {}^{1}D - 5d {}^{1}F^{\circ} \end{array}$	1-2, 1
7364,73	3	9,00	10,69		2-2
7286,11	0	9,00	10,70		2-1
7241,32	2	9,00	10,71		2-1
7224,24	1	9,00	10,72		2-3
7216,03	0	9,17	10,89	$3p ^{1}S - 6d ^{1}P^{\circ}$	0—1
7202,26	2	9,00	10,72	$3p ^{1}D - 5d ^{1}P^{\circ}$	2—1
7132,11	1	8,65	10,38	$3p ^{3}D - 4d ^{3}F^{\circ}$	3—3
7122,20	1	8,64	10,38	$3p ^{3}D - 4d ^{3}F^{\circ}$	2—2
7119,67	7	8,64	10,38	$3p ^{3}D - 5s ^{3}P^{\circ}$	2—1
7116,99 7115,19 7113,18 7111,48	8 9 9 7	8,65 { 8,64 8,64 8,65 8,64	10,39 10,38 10,38 10,38 10,38	$3p \ ^3D - 5s \ ^3P^{\circ}$ $3p \ ^3D - 5s \ ^3P^{\circ}$ $3p \ ^3D - 4d \ ^3F^{\circ}$ $3p \ ^3D - 4d \ ^3F^{\circ}$ $3p \ ^3D - 4d \ ^3F^{\circ}$	3—2 1—0 2—3 3—4 1—2
7108,94	3	8,64	10,38	$3p \ ^3D - 5s \ ^3P^\circ \ 3p \ ^3D - 5s \ ^3P^\circ \ 3p \ ^3D - 4d \ ^3D^\circ \ 3p \ ^3D - 4d \ ^3D^\circ \ 3p \ ^3D - 4d \ ^3D^\circ \ $	1—1
7100,12	5	8,64	10,39		2—2
7093,25	3	8,65	10,39		3—2
7087,83	4	8,65	10,40		3—3
7085,51	0	8,64	10,39		2—1
7076,48	2	8,64	10,39	$3p ^3D - 4d ^3D^{\circ}$	2—2
7074,86	1	8,64	10,39	$3p ^3D - 4d ^3D^{\circ}$	1—1
7056,87	0	8,64	10,38	$3p ^3D - 5s^{1}p^{\circ}$	2—1
6962,31	0	8,65	10,43	$3p ^3D - 4d ^3P^{\circ}$	3—2
6828,12	6	8,54	10,35	$3p ^1P - 4d ^1D^{\circ}$	1—2
6711,29	1	8,54	10,38	$3p ^1P - 5s ^3P^{\circ}$	1—1
6688,79 6683,95 6674,11	4 4 4	8,85 8,85 8,85 8,85	10,70 10,70 10,70	3p 3P—6s 3P° 3p 3P—6s 3P° 3p 3P—6s 3P°	2—1 1—0 0—1

λ, Α	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
6671,84	5	8 ,85	10,71	$3p\ ^3P-6s\ ^3P^{\circ}\ 3p\ ^3P-5d\ ^3D^{\circ}$	2—2
6663,04	4	8 ,85	10,71		2—2
6662,73 6655,51 6654,61 6653,95 6617,23	3 6 3 1 0	8,85 8,54 9,00 8,85 9,00	10,71 10,40 10,86 10,71 10,87	$3p \ ^{3}P - 6s \ ^{3}P^{\circ} \ 3p \ ^{1}P - 5s \ ^{1}P^{\circ} \ 3p \ ^{1}D - 6d \ ^{1}D^{\circ} \ 3p \ ^{3}P - 5d \ ^{3}D^{\circ} \ 3p \ ^{1}D - 7s \ ^{3}P^{\circ}$	1-2 $1-1$ $2-2$ $1-2$ $2-1$
6611,35 6605,79 6602,42 6596,85 6595,24	4 1 2 1	8 ,85 8 ,85 8 ,85 8 ,85 8 ,85 8 ,85	10,72 10,73 10,72 10,73 10,73	$3p \ ^{3}P - 5d \ ^{3}P^{\circ}$	2—2 2—1 1—2 1—1 1—0
6591,45	1	8,85	10,73	$3p \ ^{3}P - 5d \ ^{3}P^{\circ}$ $3p \ ^{1}P - 4d \ ^{1}P^{\circ}$ $3p \ ^{1}D - 7s \ ^{1}P^{\circ}$ $3p \ ^{1}D - 6d \ ^{1}F^{\circ}$ $3p \ ^{1}D - 6d \ ^{1}P^{\circ}$	0-1
6587,61	8	8,54	10,42		1-1
6586,27	2	9,00	10,88		2-1
6578,77	2	9,00	10,89		2-3
6568,71	2	9,00	10,89		2-1
6417,54 6413,55 6397,98 6389,87 6378,79	2 3 5 2	8 ,77 8 ,77 8 ,77 8 ,77 8 ,77	10,70 10,70 10,71 10,71 10,71	$3p \ ^3S - 6s \ ^3P^{\circ}$ $3p \ ^3S - 5d \ ^3D^{\circ}$ $3p \ ^3S - 6s \ ^1P^{\circ}$	1-0 1-1 1-2 1-2 1-1
6342,32	2	8 ,77	10,72	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2
6337,20	1	8 ,77	10,73		1-1
6335,70	0	8 ,77	10,73		1-0
6292,37	2	9 ,00	10,97		2-2
6242,70	1	9 ,00	10,99		2-3
6237 ,27	1	9,00	10,99	$3p ^{1}D - 7d ^{1}P^{\circ} \ 3p ^{3}P - 7s ^{3}P^{\circ} \ 3p ^{3}P - 7s ^{3}P^{\circ}$	2-1
6120 ,82	2	8,85	10,87		2-1
6115 ,85	2	8,85	10,87		1-0
6113 ,15	1	8,85	10,87		1-1
6108 ,53	2	8,85	10,87		0-1
6107,65 6100,46 6100,03 6098,92 6094,30	1 4 2 1 0	8 ,85 8 ,85 8 ,85 8 ,85 8 ,85 8 ,85	10,88 10,88 10,88 10,88 10,88	$3p \ ^{3}P - 7s \ ^{3}P^{\circ} \ 3p \ ^{3}P - 6d \ ^{3}D \ 3p \ ^{3}P - 7s \ ^{3}P^{\circ} \ 3p \ ^{3}P - 6d \ ^{3}D^{\circ} \ 3p \ ^{3}P - 7s \ ^{1}P^{\circ}$	2—2 2—2 1—2 2—3 2—1
6092 ,84	1	8,85	10,88	$3p \ ^{3}P - 6d \ ^{3}D^{\circ}$ $3p \ ^{3}P - 7s \ ^{1}P^{\circ}$ $3p \ ^{1}D - 8d \ ^{1}D^{\circ}$ $3p \ ^{3}P - 6d \ ^{3}P^{\circ}$ $3p \ ^{3}P - 6d \ ^{3}P^{\circ}$	1—2
6086 ,69	0	8,85	10,88		1—1
6079 ,77	1	9,00	11,04		2—2
6078 ,40	2	8,85	10,89		2—2
6070 ,83	1	8,85	10,89		1—2
6068 ,25	0	8,64	10,69	$3p \ ^{3}D - 5d \ ^{1}D^{\circ}$ $3p \ ^{3}P - 6d \ ^{3}P^{\circ}$ $3p \ ^{1}D - 9s \ ^{1}P^{\circ}$ $3p \ ^{1}D - 8d \ ^{1}F^{\circ}$ $3p \ ^{1}D - 8d \ ^{1}P^{\circ}$	2—2
6062 ,09	0	8,85	10,89		0—1
6044 ,79	0	9,00	11,05		2—1
6042 ,46	1	9,00	11,05		2—3
6039 ,17	0	9,00	11,05		2—1
6019 ,87 6016 ,45 6014 ,85 6013 ,22	0 6 9 10	8,64 8,64 8,64 { 8,65 8,65	10,70 10,70 10,70 10,71 10,70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 2—3 2—1 3—2 3—4
6012 ,24	5	8 ,64	10,70	$3p \ ^{3}D - 5d \ ^{3}F^{\circ}$	1-2 $1-0$ $1-1$ $3-2$
6010 ,68	7	8 ,64	10,70	$3p \ ^{3}D - 6s \ ^{3}P^{\circ}$	
6007 ,18	6	8 ,64	10,70	$3p \ ^{3}D - 6s \ ^{3}P^{\circ}$	
6006 ,03	9	8 ,65	10,71	$3p \ ^{3}D - 5d \ ^{3}D^{\circ}$	
6003 ,67	1	8 ,64	10,71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1
6002 ,98	4	8 ,65	10,71		3—3

λ, Α	I	$E_{ m H}^{},~{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
		н	В,		
6001,13	8	8,64	10,71	$3p \ ^3D - 6s \ ^3P^{\circ}$	2-2
5996,06 5989,40	$rac{2}{1}$	8,64 7,95	10,71 10,02	$3p \ ^{3}D - 5d \ ^{3}D^{\circ}$ $2p^{3} \ ^{3}D^{\circ} - ^{4}p \ ^{3}D$	1—1 2—1
5989,03	$\overset{1}{2}$	7,95	10,02	$2p^{3} 3D^{\circ} - 4p 3D$	1-1
5984,26	3	8 ,64	10,71	$3p 3D - 6s P^{\circ}$	2—1
5982,67	$\frac{2}{0}$	$\frac{7,95}{7,05}$	10.02	$2p^{3} {}^{3}D^{\circ} - 4p {}^{3}D$	2—2
5982,27 5981,22	1	7,95 7, 95	$10,02 \\ 10,02$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 2 \\ 3 - 2 \end{array} $
5972 ,59	0	8,64	10,72	$3p^{3}D - 5d^{1}F^{\circ}$ $2p^{3}D - 4p^{3}D$	2-3
5970,73	0 4	7,95	10,02	$2p^{3} {}^{3}D^{\circ} - 4p^{3}D$	2-3
5969 ,33 5963 ,99	4	7,95 8,65	$10,02 \\ 10,72$	$\frac{2p^3}{3p}\frac{3D^{\circ}-4p}{3D}\frac{3D}{5d}\frac{3P^{\circ}}{3P}$	$ \begin{array}{c} 3 - 3 \\ 3 - 2 \end{array} $
5952,13	2	8,64	10,72	$3p$ ^3D-5d $^3P^\circ$	2-2
5950,04	1	8,64	10,72	$3p \ ^3D - 5d \ ^1P^{\circ}$	2—1
5947 ,61 5943 ,39	1 0	8 ,64 9 ,00	73, 10 11,09	$3p \ ^3D - 5d \ ^3P^{\circ} \ ^3p \ ^1D - 9d \ ^1D^{\circ}$	$\begin{array}{c} 2-1 \\ 2-2 \end{array}$
5940,10	0	3,60 8,64	10,73	$3p ^3D - 5d ^3P^{\circ}$	2 <u></u> 2 11
5912,58	ö	9,00	11,10	$3p {}^{1}D - 9d {}^{1}F^{\circ}$	2-3
5892 ,00	1	8 ,77	10,87	$3p {}^{3}S - 7s {}^{3}P^{\circ}$	1-0
5889 ,52	$\frac{2}{2}$	8,77	10,87 10,88	$\frac{3p}{3p}\frac{3S}{3S}$ $\frac{3P}{3S}$ $\frac{3P}{3S}$	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
58 7 7 ,31 5870 ,66	$\frac{2}{3}$	8 ,77 8 , 7 7	10,88	$3p \ ^{3}S - 6d \ ^{3}D^{\circ}$	$1-2 \\ 1-2$
5864,95	0	8,77	10 ,88	$3p^{3}S - 7s^{1}P^{\circ}$	1—1
5850,25	0	8,77	10,89	$3p^{3}P - 7d^{3}D^{\circ}$	1-2
5846,35	0	8,77	10,89	$\frac{3p}{3p}\frac{^3S-6d}{^3P}$	1—1 2—1
582 4 ,64 5819 ,50	1 1	8 ,85 8 ,85	10,98 10,98	$3p ^{3}P - 8s ^{3}P^{\circ}$	2—1 1—0
5817,70	0	8,85	10,98	$3p^{3}P - 8s^{3}P^{\circ}$	1—1
5813 ,51	1	8,85	10,98	$3p^{3}P - 8s^{3}P^{\circ}$	0-1
5805,80	3	8,85 8,85	$10,98 \\ 10,98$	$\begin{cases} 3p^{3}P - 7d^{3}D^{\circ} \\ 3p^{3}P - 8s^{3}P^{\circ} \end{cases}$	$\begin{array}{c} 2-2 \\ 1-2 \end{array}$
5805,19	4	7,95	10,08	$2p^{3} ^{3}D^{\circ} - 4p ^{3}P$	1—0 2—1
5800,59	$\frac{6}{3}$	7 ,95 7 ,95	10,08 10,08	$2p^{3} ^{3}D^{\circ} - 4p ^{3}P$ $2p^{3} ^{3}D^{\circ} - 4p ^{3}P$	2—1 1—1
5800 ,23 5798 ,90	$\overset{3}{0}$	8,85	10,98	$^{3}p ^{3}P - ^{7}d ^{3}D^{\circ}$	1-2
5794,46	3	7,95	10 ,08	$2p^{3} {}^{3}D^{\circ} - 4p {}^{3}P$	2-2
5793,12	7	7,95	10,08	$2p^{3} {}^{3}D^{\circ} - 4p {}^{3}P 3p {}^{1}P - 6s {}^{3}P^{\circ}$	3—2 1—1
5720,78	2	8,54	10,70	$3p ^{1}P - 6s ^{1}P^{\circ}$	1—1
5693 ,11 5668 ,96	3 7	8 ,54 8 ,54	10,71 10,72	$3p ^{1}P - 0s ^{1}P$	1-1
5629 ,93	i	8,85	11,05	$3n^{3}P - 8d^{3}D^{\circ}$	2—2
5676,49	0	8,77	10.98	$3p^{3}S - 8s^{3}P^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \end{array} $
5674,81 5603,73	0 0	8,77 8,77	10,98 10,98	$3p^{3}S - 8s^{3}P^{\circ}$ $3p^{3}S - 8s^{3}P^{\circ}$ $3p^{3}S - 8s^{3}P^{\circ}$ $3p^{3}S - 8s^{3}P^{\circ}$	1 - 2
5597,30	ĭ	8,77	10,98	$3p ^{3}S - 7d ^{3}D^{\circ}$	1—2
555 3 ,17	1	8 ,64	10,87	$3p ^3D - 6d ^3F^{\circ}$	2—3 2—1
5551,59	$\begin{array}{c} 5 \\ 2 \end{array}$	8 ,64 8 ,65	10,87 10,88	$3p \ ^{3}D - 7s \ ^{3}P^{\circ} 3p \ ^{3}D - 7s \ ^{3}P^{\circ}$	$\frac{2-1}{3-2}$
5551 ,03 5548 ,90	1	8,65	10,88	$3p ^3D - 6d ^3F^{\circ}$	3—4
5548,24	$\bar{0}$	8,64	10 ,87	$3p ^3D-6d ^3F^{\circ}$	1—2
5547,27	3	8,64	10,87	$3p \ ^{3}D - 7s \ ^{3}P^{\circ}$	1—0 1—1
5545,07	6	$ \begin{smallmatrix} 8,64 \\ 8,65 \end{smallmatrix} $	10 ,87 10 ,88	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2
5543 ,82	0	8,65	10,88	$3p ^3D - 6d ^3D^{\circ}$	3—3
5540,76	2	8 ,64	10,88	$3p\ ^{3}D-7s\ ^{3}P^{\circ}$	2—2
5534 ,81	1	8,64	10,88	$3p \ ^3D - 6d \ ^3D^{\circ} \ 3p \ ^3D - 7s \ ^1P^{\circ}$	2—2 2—1
5529 ,78	$\frac{1}{2}$	8 ,64 8 ,65	10 ,88 10 ,89	$3p ^{3}D - 6d ^{3}P^{\circ}$	3—2
5526 ,84 5516 ,64	$\overset{2}{0}$	8,64	10,83	$3p ^3D - 6d ^3P^{\circ}$	2—2
5515 , 69	0	8,85	11,10	$3n^3P-9d^3D^{\circ}$	2-2
5380,34	10	7,68	9,99	$3s {}^{1}P^{\circ} - 4p {}^{1}P$ $3s {}^{1}P^{\circ} - 4p {}^{1}D$	1—1 1—1
531 7, 46 5306,84	$rac{1}{2}$	7,68 8,64	10,02 10,98	$3p \ ^{3}D - 8s \ ^{3}P^{\circ}$	2—1
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λ. Α	I	E _H , eV	E _B . eV	Transition	J
5306,32 5302,35 5300,84 5300,55 5300,12	0 1 1 3 1	8,65 8,64 8,64 8,65 8,54	10,98 10,98 10,98 10,99 10,87	$3p \ ^{3}D - 8s \ ^{3}P^{\circ}$ $3p \ ^{3}D - 8s \ ^{3}P^{\circ}$ $3p \ ^{3}D - 8s \ ^{3}P^{\circ}$ $3p \ ^{3}D - 7d \ ^{3}D^{\circ}$ $3p \ ^{1}P - 7s \ ^{3}P^{\circ}$	3-2 1-0 1-1 3-2 1-1
5296, 93 5291, 22 5288, 32 5280, 24	0 1 0 2	8,64 8,64 8,64 8,54	10,98 10,99 10,98 10,88	$3p \ ^3D - 8s \ ^3P^{\circ} \ 3p \ ^3D - 7d \ ^3D^{\circ} \ 3p \ ^3D - 8s \ ^1P^{\circ} \ 3p \ ^1P - 7s \ ^1P^{\circ}$	2—2 2—2 2—1 1—1
5268,96 5159,92 5155,29 5153,57 5089,63 5076,59 5064,15 5059,66	4 1 1 2 0 1 0 0	8,54 8,64 8,65 8,54 8,54 8,54	10,89 11,04 11,04 11,05 10,97 10,98 11,09 10,98	$3p^{1}P - 6d^{1}P^{a}$ $3p^{3}D - 9_{s}^{3}P^{\circ}$ $3p^{3}D - 9_{s}^{3}P^{\circ}$ $3p^{3}D - 8d^{3}D^{\circ}$ $3p^{1}P - 7d^{1}D^{\circ}$ $3p^{1}P - 8s^{3}P^{\circ}$ $3p^{3}D - 10_{s}^{3}P^{\circ}$ $3p^{1}P - 8s^{1}P^{\circ}$	1-1 2-1 1-0 3-2 1-2 1-1 2-1 1-1
5057,68 5053,52 5052,17 5041,80 5041,48 5040,13 5039,07 5024,92 5023,85 5018,06 5017,76 5017,09 5012,28 5012,00 4991,41 4943,58 4942,02 4932,05	0 2 8 6 6 4 7 3 7 2 1 3 2 2 0 0 8	8,65 8,54 7,68 7,95 7,95 7,95 7,95 7,95 7,95 7,95 7,95	11,10 10,99 10,14 10,41 10,41 10,41 10,42 10,42 10,42 10,42 10,42 10,42 10,42 10,42 11,13 11,15 11,04 10,20	$\begin{array}{c} 3p\ ^3D - 9d\ ^3D^{\circ} \\ 3p\ ^1P - 7d\ ^1P^{\circ} \\ 3s\ ^1P - 7d\ ^1P^{\circ} \\ 3s\ ^1P - 4p\ ^1D \\ 2p\ ^3\ ^3D^{\circ} - 4f\ F\ (2^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ F\ (3^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ F\ (3^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ G\ (3^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ G\ (3^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ D\ (2^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ D\ (2^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ D\ (1^{1}/_2) \\ 2p\ ^3\ ^3D^{\circ} - 4f\ D\ (1^{1}/_2) \\ 2p\ ^3\ ^3D - 10d\ ^3D^{\circ} \\ 3p\ ^3D - 11d\ ^3D^{\circ} \\ 3p\ ^1P - 9\ _3\ ^p^{\circ} \\ 3s\ ^1P^{\circ} - 4p\ ^1S \end{array}$	3-2 1-1 1-2 2-3, 2 1-2 2-3 3-4, 3 2-3, 2 1-2, 1 3-2, 1 3-2, 1 3-2, 1 1-2, 1 1-0
4926,40 4922,68 4898,63 4893,43 4890,65 4888,91 4836,76 4826,80 4817,37	0 1 1 0 2 1 0 3 4	8,54 8,54 7,49 7,48 7,49 7,48 8,54 7,49 7,48	11,05 11.05 10.02 10.02 10,02 10,02 11,10 10,06 10,06	$3p^{1}P - 9s^{1}P^{\circ}$ $3n^{1}P - 8d^{1}P^{\circ}$ $3s^{3}P^{\circ} - 4p^{3}D$ $3s^{3}P^{\circ} - 4p^{3}D$ $3s^{3}P^{\circ} - 4p^{3}D$ $3s^{3}P^{\circ} - 4p^{3}D$ $3p^{1}P - 9d^{1}p^{\circ}$ $3s^{3}P^{\circ} - 4p^{3}S$ $3s^{3}P^{\circ} - 4p^{3}S$	1-1 1-1 2-2 1-1 2-3 1-2; 0-1 1-1 2-1 !-1
4812,92 4796,08 4795,88 4792,65 4791,71 4783,80 4775,91 4771,75 4770,03 4766,68 4762,54 4762,31 4742,57 4738,47 4738,21 4735,17 4734,26	2 0 0 0 1 6 8 5 4 5 5 2 3 1 2 5	7,48 7,95 7,95 7,95 7,95 7,49 7,49 7,48 7,48 7,48 7,48 7,95 7,95 7,95 7,95	10,06 10,53 10,53 10,53 10,54 10,08 10,08 10,08 10,08 10,08 10,08 10,08 10,56 10,57 10,57 10,57	$3s \ ^{3}P^{\circ}-4p \ ^{3}S$ $2p^{3} \ ^{3}D^{\circ}-5p \ ^{3}D$ $3s \ ^{3}P^{\circ}-4p \ ^{3}P$ $2p^{3} \ ^{3}D^{\circ}-5p \ ^{3}P$	0-1 2-1 1-1 2-2 3-2 3-3 2-1 2-2 1-0 1-1 1-2 0-1 1-0 2-1 1-1 2-2 3-2

λ, Α	I	$E_{ m H}^{},$ eV	E _B , eV	Transition	J
4478 ,83	4	7,95	10,72	$2p^3 ^3D^{\circ} - 5f F (2^{1/2})$	2-3, 2
4478 ,59	4	7,95	10,72	$2p^3 ^3D^{\circ} - 5f F (2^{1/2})$	1-2
4478 ,32	2	7 ,95	10,72	$2p^3 ^3D^{\circ} - 5f F (3^{1/2})$	2-3
4477 ,47	4	7,95	10,72	$2p^3$ $^3D^{\circ}$ — $5f$ F $(3^1/_2)$	3-4, 3
4467 ,31	2	7,95	10,72	$2p^3$ $^3D^{\circ}$ — $5f$ G $(3^1/_2)$	2-3
4466 ,48	5	7,95	10,72	$2p^3$ $^3D^{\circ}$ — $5f$ G $(3^1/_2)$	3-4, 3
4464 ,68	2	7,95	10,72	$2p^3$ $^3D^{\circ}$ — $5f$ D $(2^1/_2)$	2-3, 2
4464 ,45	1	7,95	10,72	$2p^3$ $^3D^{\circ}$ — $5f$ D $(2^1/_2)$	1-2
4463 ,89	2	7,95	10,72	$\begin{array}{c} 2p^3 \ ^3D \ ^{\circ} - 5f \ D \ (2^{1/_2}) \\ 2p^3 \ ^3D \ ^{\circ} - 5f \ D \ (1^{1/_2}) \\ 2p^3 \ ^3D \ ^{\circ} - 5f \ D \ (1^{1/_2}) \\ 3s \ ^1P \ ^{\circ} - 5p \ ^1P \\ 3s \ ^1P \ ^{\circ} - 5p \ ^3D \end{array}$	3-3, 2
4461 ,50	1	7,95	10,72		2-2, 1
4461 ,30	1	7,95	10,72		1-2, 1
4371 ,37	6	7,68	10,52		1-1
4355 ,41	1	7,68	10,53		1-1
4348 ,97 4344 ,31 4344 ,11 4342 ,40	1 1 0 0	7,95 7,95 7,95 7,95	10,80 10,80 10,80 10,80	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 1 - 1 \\ 2 - 2 \end{array} $
4341,64 4269,02 4228,33 4223,36 4223,16	2 6 5 3 4	7,95 7,68 7,68 7,95 { 7,95 { 7,95	10,80 10,59 10,62 10,88 10,88 10,88	$2p^{3} ^{3}D^{\circ} - 6p ^{3}P$ $3s ^{1}P^{\circ} - 5p ^{1}D$ $3s ^{1}P^{\circ} - 5p ^{1}S$ $2p^{3} ^{3}D^{\circ} - 6f F (2^{1}/_{2})$ $2p^{3} ^{3}D^{\circ} - 6f F (2^{1}/_{2})$ $2p^{3} ^{3}D^{\circ} - 6f F (3^{1}/_{2})$	$ \begin{array}{c} 3-2 \\ 1-2 \\ 1-0 \\ 2-3, 2 \\ 1-2 \\ 2-3 \end{array} $
4222 ,47 4213 ,07 4212 ,33 4211 ,82 4211 ,61	3 2 4 2 1	7,95 7,95 7,95 7,95 7,95 7,95	10,88 10,89 10,89 10,89 10,89	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4, 3 2-3 3-4, 3 2-3, 2 1-2
4211,12	2	7,95	10,89	$\begin{array}{c} 2p^3 \ ^3D° - 6f \ D \ (2^1/_2) \\ 2p^3 \ ^3D° - 6f \ D \ (1^1/_2) \\ 2p^3 \ ^3D° - 6f \ D \ (1^1/_2) \\ 2p^3 \ ^3D° - 7p \ ^3P \\ 2p^3 \ ^3D° - 7p \ ^3P \end{array}$	3-3, 2
4209,91	0	7,95	10,89		2-2, 1
4209,71	0	7,95	10,89		1-2, 1
4153,37	0	7,95	10,93		1-0
4147,98	1	7,95	10,93		2-1
4146 ,97	0	7,95	10,93	$\begin{array}{c} 2p^{3} \ ^{3}D^{\circ} - 7p \ ^{3}P \\ 2p^{3} \ ^{3}D^{\circ} - 7p \ ^{3}P \\ 2p^{3} \ ^{3}D^{\circ} - 7f \ F \ (2^{1}/_{2}) \\ 2p^{3} \ ^{3}D^{\circ} - 7f \ F \ (2^{1}/_{2}) \\ 2p^{3} \ ^{3}D^{\circ} - 7f \ F \ (3^{1}/_{2}) \end{array}$	2—2
4146 ,26	2	7,95	10,93		3—2
4083 ,16	1	7,95	10,98		2—3, 2
4082 ,98	1	7,95	10,98		1—2
4082 ,40	1	7,95	10,98		3—4, 3
4073,33	1	7,95	10,99	$\begin{array}{c} 2p^{3} \ ^{3}D^{\circ} - 7f \ G \ (3^{1}/_{2}) \\ 2p^{3} \ ^{3}D^{\circ} - 7f \ G \ (3^{1}/_{2}) \\ 3s \ ^{3}P^{\circ} - 5p \ ^{3}D \\ 3s \ ^{3}P^{\circ} - 5p \ ^{3}D \\ 3s \ ^{3}P^{\circ} - 5p \ ^{3}D \end{array}$	2-3
4072,64	3	7,95	10,99		3-4
4070,97	2	7,49	10,53		2-2
4066,75	2	7,48	10,53		1-1
4065,25	4	7,49	10,54		2-3
4064 ,27 4063 ,58 4033 ,23 4031 ,80 4029 ,41	3 2 0 3 4	7,48 7,48 7,95 7,49 7,49	10,53 10,53 11,02 10,57 10,57	$3s \ ^{3}P^{\circ} - 5p \ ^{3}D$ $3s \ ^{3}P^{\circ} - 5p \ ^{3}D$ $2p^{3} \ ^{3}D^{\circ} - 8p \ ^{3}P$ $3s \ ^{3}P^{\circ} - 5p \ ^{3}P$ $3s \ ^{3}P^{\circ} - 5p \ ^{3}P$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 3-2 \\ 2-1 \\ 2-2 \end{array} $
4028,36	2	7,48	10,56	$3s \ ^3P^{\circ} - 5p \ ^3P$	1—0
4025,22	1	7,48	10,57	$3s \ ^3P^{\circ} - 5p \ ^3P$	1—1
4022,84	3	7,48	10,57	$3s \ ^3P^{\circ} - 5p \ ^3P$	1—2
4022,12	2	7,48	10,57	$3s \ ^3P^{\circ} - 5p \ ^3P$	0—1
4009,93	4	7,68	10,77	$3s \ ^1P^{\circ} - 6p \ ^1P$	1—1
4002 ,98 399 7 ,14	$\frac{2}{1}$	7,68 7,95	10,78 11,05	$3s {}^{1}P^{\circ} - 6p {}^{3}D \\ 2p^{3} {}^{3}D^{\circ} - 8f F (2^{1}/_{2})$	1—1 2—3, 2
3996 ,97	0	7 ,95	11,05	$2p^3 ^3D^{\circ}$ —8f $F (2^{1/2})$	1-2
3996 ,49	0	7 ,95		$2p^3 ^3D^{\circ}$ —8f $F (3^{1/2})$	3-4, 3
3986 ,88	1	7 ,95		$2p^3 ^3D^{\circ}$ —8f $G (3^{1/2})$	3-4, 3

λ, Λ	I	F	E eV	Transition	J
	1	E _H , eV	E _B . eV	Transition	J
3961,40 3942,22 3833,35 3828,85 3804,31	3 3 2 2	7,68 7,68 7,68 7,68 7,68	10,81 10,82 10,91 10,92 10,94	$3s {}^{1}P^{\circ} - 6p {}^{1}D$ $3s {}^{1}P^{\circ} - 6p {}^{1}S$ $3s {}^{1}P^{\circ} - 7p {}^{1}P$ $3s {}^{1}P^{\circ} - 7p {}^{3}D$ $3s {}^{1}P^{\circ} - 7p {}^{1}D$	1-2 $1-0$ $1-1$ $1-1$ $1-2$
3793,68 3763,96 3762,25 3757,84 3757,05 3756,52	2 0 2 1 3 2	7,68 7,48 7,49 7,48 7,49 7,48	10,95 10,77 10,78 10,78 10,79 10,78	$3s {}^{1}P^{\circ} - 7p {}^{1}S$ $3s {}^{3}P^{\circ} - 6p {}^{1}P$ $3s {}^{3}P^{\circ} - 6p {}^{3}D$	1-0 $1-1$ $2-2$ $1-1$ $2-3$ $1-2$
3755,12 3742,85 3741,44 3740,79 3737,19	1 1 2 0 0	7,48 7,49 7,49 7,48 7,48	10,78 10,80 10,80 10,80 10,80	$3s \ ^{3}P^{\circ}-6p \ ^{3}D$ $3s \ ^{3}P^{\circ}-6p \ ^{3}P$	0-1 $2-1$ $2-2$ $1-0$ $1-1$
3735,78 3734,51 3732,35 3729,03 3712,04 3705,56	1 0 2 1 1 1	7,48 7,48 7,68 7,68 7,68 7,68	10,80 10,80 11,00 11,01 11,02 11,02	$3s ^{3}P^{\circ} - 6p ^{3}P$ $3s ^{3}P^{\circ} - 6p ^{3}P$ $3s ^{1}P^{\circ} - 8p ^{1}P$ $3s ^{1}P^{\circ} - 8p ^{3}D$ $3s ^{1}P^{\circ} - 8p ^{1}D$ $3s ^{1}P^{\circ} - 8p ^{1}S$	1-2 0-1 1-1 1-1 1-2 1-0
3668,60 3652,82 3648,62 3625,61 3609,56 3608,70 3607,94 3603,95 3603,53 3603,44 3601,47 3595,14 3518,31 3514,80 3458,50 3420,41 2967,244	1 0 0 0 0 0 1 0 0 0 2 1 0 0 0 0 2 1 0 0 0 0	7,68 7,68 7,68 7,68 7,68 7,68 7,49 7,48 7,49 7,48 7,49 7,68 7,49 7,49 7,49 7,49 7,49 0,00	11,06 11,08 11,08 11,10 11,12 10,92 10,91 10,92 10,93 10,92 10,93 11,13 11,00 11,02 11,07 11,11 4,18	$3s ^1P^{\circ} - 9p ^1P$ $3s ^1P^{\circ} - 9p ^1D$ $3s ^1P^{\circ} - 9p ^1S$ $3s ^1P^{\circ} - 9p ^1S$ $3s ^1P^{\circ} - 10p ^1P$ $3s ^1P^{\circ} - 10p ^1S$ $3s ^3P^{\circ} - 7s ^3D$ $3s ^3P^{\circ} - 7p ^3D$ $3s ^3P^{\circ} - 1p ^1P$ $3s ^3P^{\circ} - 8p ^1P$ $3s ^3P^{\circ} - 8p ^3D$ $3s ^3P^{\circ} - 9p ^3D$ $3s ^3P^{\circ} - 9p ^3D$ $3s ^3P^{\circ} - 10p ^3D$ $2p^2 ^3P - 2p^3 ^5S^{\circ}$	1—1 1—2 1—0 1—1 1—0 2—2 1—1 1—1 2—3 1—2 0—1 2—2 1—1 1—1 2—3 2—3 2—3 2—3 2—3 2—3
2964,846 2582,901 2478,556 1993,627 1930,905 1765,366 1763,909 1751,827 1658,121 1657,907 1657,379 1657,008	2 5 16 2 10 1 2 8 5 4 2 10	0,00 2,68 2,68 1,26 1,26 2,68 2,68 2,68 0,00 0,00 0,00 0,00	4,18 7,48 7,68 7,68 7,68 9,71 9,71 9,76 7,48 7,48 7,48 7,49	$\begin{array}{c} 2p^2 \ ^3P - 2p^3 \ ^5S^\circ \\ 2p^2 \ ^1S - 3s \ ^3P^\circ \\ 2p^2 \ ^1S - 3s \ ^1P^\circ \\ 2p^2 \ ^1D - 3s \ ^3P^\circ \\ 2p^2 \ ^1D - 3s \ ^1P^\circ \\ 2p^2 \ ^1S - 3d \ ^1D^\circ \\ 2p^2 \ ^1S - 3d \ ^1D^\circ \\ 2p^2 \ ^1S - 3d \ ^1P^\circ \\ 2p^2 \ ^3P - 3s \ ^3P^\circ \\ \end{array}$	1-2 0-1 0-1 2-1 2-1 0-1 0-1 0-1 2-1 1-0 1-1 2-2
1656,930 1656,268 1602,971 1561,435 1561,337	$\begin{array}{c} 3 \\ 5 \\ 5 \\ 20 \\ 2 \end{array}$	0,00 0,00 2,68 0,00 0,00	7,48 7,49 10,42 7,95 7,95	$2p^2$ 3P — $3s$ $^3P^\circ$ $2p^2$ 3P — $3s$ $^3P^\circ$ $2p^2$ 1S — $4d$ $^1P^\circ$ $2p^2$ 3P — $2p^3$ $^3D^\circ$ $2p^2$ 3P — $2p^3$ $^3D^\circ$	0-1 $1-2$ $0-1$ $2-3$ $2-2$, 1
1560,691 1560,306 1542,177	15 8 2	0,00 0,00 2,68	7,95 7,95 10,72	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2, 1 0-1 0-1

2 À	ī	I aV	'k aV	Transition	,
λ, Α	I	$E_{\rm H}$, eV	E _B , eV	11 ansition	J
1510 ,924 1481 ,762	1 7	2 ,68 1 ,26	10,88 9,63	$2p^2$ 1S $-7s$ $^1P^\circ$ $2p^2$ 1D $-3d$ $^1D^\circ$	$0-1 \\ 2-2$
1472,231 1470,082 1468,410 1467,405 1463,336 1459,032 1432,530 1432,105 1431,597	0 1 15 3 6 2 1 2 2	1,26 1,26 1,26 1,26 1,26 1,26 4,18 4,18 4,18	9,68 9,70 9,71 9,71 9,74 9,76 12,84 12,84	$\begin{array}{c} 2p^{2} ^{1}D - 4s ^{3}P^{\circ} \\ 2p^{2} ^{1}D - 3d ^{3}F^{\circ} \\ 2p^{2} ^{1}D - 3d ^{3}D^{\circ} \\ 2p^{2} ^{1}D - 4s ^{1}P^{\circ} \\ 2p^{2} ^{1}D - 3d ^{1}F^{\circ} \\ 2p^{2} ^{1}D - 3d ^{1}P^{\circ} \\ 2p^{3} ^{5}S^{\circ} - 3s ^{5}P \\ 2p^{3} ^{5}S^{\circ} - 3s ^{5}P \\ 2p^{3} ^{5}S^{\circ} - 3s ^{5}P \end{array}$	2-1 2-3 2-1 2-1 2-3 2-1 2-1 2-2 2-3
1364,165 1359,329 1357,140 1355,825 1354,292 1329,588 1329,103 1328,834 1315,903 1313,471	6 2 3 6 5 6 5 6 5 4 6	1,26 1,26 1,26 1,26 1,26 0,00 0,00 0,00 1,26 1,26	10,35 10,38 10,40 10,41 10,42 9,33 9,33 9,33 10,69 10,70	$\begin{array}{c} 2p^2 {}^1\!D - 4d {}^1\!D^\circ \\ 2p^2 {}^1\!D - 4d {}^3\!F^\circ \\ 2p^2 {}^1\!D - 5s {}^1\!P^\circ \\ 2p^2 {}^1\!D - 4d {}^1\!F^\circ \\ 2p^2 {}^1\!D - 4d {}^1\!P^\circ \\ 2p^2 {}^3\!P - 2p^3 {}^3\!P^\circ \\ 2p^2 {}^1\!D - 5d {}^1\!D^\circ \\ 2p^2 {}^1\!D - 5d {}^3\!F^\circ \end{array}$	2-2 2-3 2-1 2-3 2-1 2-2, 1 1-2, 1, 0 0-1 2-2 2-3
1312,261 1311,985 1311,365 1310,646 1291,380 1289,983 1288,633 1288,445 1280,855 1280,852 1280,403 1280,403 1280,340 1280,140 1279,897 1279,230	2 2 8 4 1 3 2 5 1 4 2 6 2 5 6	1,26 1,26 1,26 1,26 1,26 1,26 1,26 1,26	10,71 10,71 10,72 10,72 10,86 10,87 10,88 10,89 9,68 9,68 9,68 9,68 9,68 9,68 9,68 9	$\begin{array}{c} 2p^2 ^1D - 5d ^3D^{\circ} \\ 2p^2 ^1D - 6s ^1P^{\circ} \\ 2p^2 ^1D - 5d ^1F^{\circ} \\ 2p^2 ^1D - 5d ^1P^{\circ} \\ 2p^2 ^1D - 6d ^1D^{\circ} \\ 2p^2 ^1D - 6d ^3F^{\circ} \\ 2p^2 ^1D - 6d ^3F^{\circ} \\ 2p^2 ^1D - 6d ^1F^{\circ} \\ 2p^2 ^1D - 6d ^1F^{\circ} \\ 2p^2 ^1D - 6d ^1P^{\circ} \\ 2p^2 ^1D - 6d ^1P^{\circ} \\ 2p^2 ^3P - 4s ^3P^{\circ} \\ 2p^2 ^3P - 3d ^3F^{\circ} \end{array}$	2-3 2-1 2-3 2-1 2-2 2-3 2-1 2-3 2-1 2-1 1-0 1-1 2-2 0-1 1-2 2-3
1277,727 1277,551 1277,282 1277,154 1276,754 1276,754 1274,880 1274,131 1267,633 1266,449 1261,560 1261,430 1261,128 1261,000 1260,930 1260,738 1260,670 1253,538 1197,812 1194,656 1194,494	$\frac{2}{0,5}$	0,00 0,00 0,00 0,00 1,26 1,26 0,00 1,26 1,26 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0	9,71 9,71 9,71 9,71 9,71 10,99 10,99 9,74 11,04 11,05 9,83 9,83 9,83 9,83 9,83 11,10 11,15 10,35 10,38 10,38	$\begin{array}{c} 2p^2 {}^{3}P - 3d {}^{3}D^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}D^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}D^{\circ} \\ 2p^2 {}^{3}P - 4s {}^{1}P^{\circ} \\ 2p^2 {}^{3}P - 4s {}^{1}P^{\circ} \\ 2p^2 {}^{3}P - 4s {}^{1}P^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{1}F^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}P^{\circ} \\ 2p^2 {}^{3}P - 4d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 4d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 4d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 5s {}^{3}P^{\circ} \\ \end{array}$	2-2 2-3; 1-1 1-2; 0-1 0-1 1-1 2-3 2-1 2-3, 2 2-3, 2 2-1 1-2 1-1 1-0 0-1 2-3 2-3 1-2 2-1 2-3 1-2 2-1 2-3 1-2

λ, Λ	I	E _H . eV	E _B , eV	Transition	J
1194,027	3	0,00	10,38	$2p^2 \ ^3P - 5s \ ^3P^{\circ}$	()-1
1193,674	4	0,00	10,39	$2p^2 3P - 5s 3P^{\circ}$	1-2
1193,388	3	00,00	10,39	$\frac{2p^2}{3} \frac{3P}{3} - 4d \frac{3D}{3}$	2-2
1193,252	10	0,00	10,40	$2p^2 ^3P - 4d ^3D^{\circ}$	2-3; 1-1
1193,013	8	0),00	10,39	$2p^{2} {}^{3}P - 4d {}^{3}D^{c}$	$0^{-1}; 1^{-2}$
1192,923	$\frac{2}{2}$	00,00	10,40	$\frac{2p^2}{2p^2}\frac{3P}{3P}$ $\frac{5s}{5s}\frac{1}{1}$ $\frac{1}{1}$	2 - 1
1192,480	2	00,00	10,40	$\frac{2p^2}{2p^2} \frac{3P-3s}{3P-4d} \frac{1}{3}F^c$	1—1 2—3
1191,855	1 6	00,00	10,41	$2p^{2} {}^{3}P$ — $4a {}^{3}P$ ° $2p^{2} {}^{3}P$ — $4d {}^{3}P$ °	2—3 2—2
1189,628	4	00,00	10,43	$2p^{2} P - 4d P$ $2p^{2} P - 4d P$	$\frac{2-2}{2-1}$
1189,556 1189,244	4	00,00 0,00	10,43 10,43	$2p^{2} {}^{3}P - 4d^{3}P^{0}$	$\frac{2-1}{1-2}$
1189,074	$\overline{3}$	0,00	10,43	$2p^{2} ^{3}P - 4d ^{3}P^{\circ}$	1-1,0
1188,935	1	0,00	10,43	$\frac{2p}{2\rho^2} \frac{1}{^3P} - \frac{4a}{4d} \frac{1}{^3P}$	0-1
1159,004	$\dot{\bar{5}}$	00,00	10,70	$2p^2 ^3P - 5d ^3F^c$	2-3
1158,729	$\ddot{3}$	0,00	10,70	$2p^2 ^3P - 5d ^3F^{\circ}$	1-2
1158, 398	$\tilde{2}$	0,00	10,71	$2p^2 ^3P - 6s^3P^{\circ}$	2-2
1158 ,138	8	00,00	10 ,71	$2p^{2} {}^{3}P - 5d {}^{3}D^{\circ}$	$_{1}$ -1; 2-3
	7	0,00	10,71	$\int 2^{2} p^{2} ^{3}P - 6 s^{3}P^{\circ}$	1—2
1158,030		0,00	10,71	$(2p^2)^3P - 5d^3D^{\circ}$	2-3
1157 ,82 5	3	00,00	10,71	$2p^2 \ ^3P - 6s \ ^1P^{\circ}$	2—1
1157 ,391	2	00,00	10,71	$2p^2 ^3P - 6s ^1P^\circ$	1—1
1157 ,333	1	00,00	10,72	$2p^2 ^3P - 5d ^1F^{\circ}$	2—3
1156,619	5	00,00	10 , 72	$2p^2 ^3P - 5d ^3P^\circ$	2—2
1156,502	1	0,00	10,73	$\begin{cases} 2p^2 {}^3P - 5d {}^3P^{\circ} \\ 2p^2 {}^3P - 5d^{\circ}P^{\circ} \end{cases}$	$\begin{array}{c} 2-1 \\ 1-1 \end{array}$
059, 1156	2	00,00	10,73	$2p^2 3P - 5d^3P^c$	1—1
1155 ,839	1	00,00	10 ,73	$2p^2 {}^{3}P - 5d {}^{3}P^{\circ}$	0—1
1141 ,7 05	1	00,00	10 ,86	$2p^2 ^3P - 6d ^1D^{\circ}$	2—2
1140,688	3	0,00	10,87	$2p^{2} {}^{3}P - 6d {}^{3}F^{\circ}$	2—3
1140,391	1	00,00	10,87	$\begin{cases} 2p^2 {}^{3}P - 6d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 6d {}^{3}D^{\circ} \end{cases}$	$\begin{array}{c} 1-2 \\ 2-1 \end{array}$
1140,070	1	0,00	10,88	$2p^{2} {}^{3}P - 6d {}^{3}D^{\circ}$	2-12
1139,894	$\overline{7}$	0,00	10,88	$2p^2 {}^{3}P - 6d {}^{3}D^{5}$	$\bar{2} - \bar{3}$, 2
1139,794	6	0,00	10,88	$2p^2 ^3P - 6d ^3D^{\circ}$	0-1
1139,142	2	0,00	10 ,89	$2p^2 ^3P - 6d ^3P^{\circ}$	$2-\bar{2}$
,037 ,037	1	00,00	10 ,89	$2p^2 ^3P - 6d ^3P^{\circ}$	2—1
625, 1138	1	0,00	10,89	$2p^2 ^3P - 6d ^3P^c$	1-1, 2
927, 1129	1	00,00	10 ,98	$2p^2 {}^3P - 7d {}^3F^c$	2—3
626, 1129	1	0,00	10,98	$2p^2 ^3P - 7d ^3F^c$	12
1129 ,161	6	00,00	10,98	$2p^2 ^3P - 7d ^3D^{\circ}$	0-1; $2-3$, 2
1128 ,748	1	0,00	10,99	$\begin{cases} 2p^2 \ ^3P - 7d \ ^3P^{\circ} \\ 2p^2 \ ^3P - 7d^{\circ}P^{\circ} \end{cases}$	$\begin{array}{c} 2-2 \\ 2-1 \end{array}$
1122,325	4	0,00	11,05	$2p^{2} {}^{3}F - 8d {}^{3}D^{\circ}$	2 - 3, 2
1122,179	1	0,00	11,05	$\frac{-p}{2p^2} {}^{3}P - 8d {}^{3}P^{\circ}$	2-2, 2
1117,706	$\overline{3}$	0,00	11,10	$2p^2 ^3P - 9d ^3D^{\circ}$	2-3, 2
1114,414	2	0,00	11,13	$2p^2 \ ^3P - 10d \ ^3D^c$	2-3, 2
945,566	3	0,00	13,12	$\frac{1}{2p^2} {}_{3}P - \frac{1}{2p^3} {}_{3}S^{\circ}$	2-1
945 ,336	2	00,00	13,12	$2p^2 {}^3P - 2p^3 {}^3S^\circ$	1-1
945,193	1	00, 0	13 ,12	$2p^2 ^3P - 2p^3 ^3S^{\circ}$	0—1

C II, ground state $1s^2 2s^2 2p^2 P^{0_{1/2}}$ Ionization potential 196659,0 cm⁻¹; 24,381 eV

λ, Α	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
8799 ,9	O	23 ,38	24,79	3p ² D-3d ² F°	$^{3/_{2}-^{5/_{2}}}_{^{5/_{2}-^{7/_{2}}}}$
8793 ,8	1	23 ,38	24,79	3p ² D-3d ² F°	

λ, Å	I	E _H , eV	E _B . eV	Transition	J
8696 ,71 8682 ,56 8414 ,49	5 8 1	19,49 19,49 (27,22 27,22	20,92 20,92 28,70 28,70	$4s^{2}S-2p^{3}^{2}P^{2} \ 4s^{2}S-2p^{3}^{2}P^{\circ} \ 4d^{4}F^{\circ}-5f^{4}G \ 4d^{4}F^{\circ}-5f^{4}G$	$1/_2$ $1/_2$ $1/_2$ $1/_2$ $3/_2$ $5/_2$ $7/_2$ $3/_2$ $5/_2$
8413,42 8076,64 8062,78 8062,12 8048,32	2 8 6 5 3	{ 27,23 27,22 23,42 23,42 23,44 23,41	28,70 28,70 24,65 24,65 24,65 24,65	$4d^{4}F^{\circ}-5f^{4}G$ $4d^{4}F^{\circ}-5f^{4}G$ $3p^{4}P-3d^{4}P^{\circ}$ $3p^{4}P-3d^{4}P^{\circ}$ $3p^{4}P-3d^{4}P^{\circ}$ $3p^{4}P-3d^{4}P^{\circ}$	9/2 $11/2$ $7/2$ $9/2$ $5/2$ $5/2$ $5/2$ $3/2$ $3/2$ $3/2$ $3/2$
8039,39 8037,76 8028,86 7530,60 7519,86	6 5 2 2 4	$23,11 \\ 23,14 \\ 23,41 \\ 20,92 \\ 21,73 \\ 20,92$	24,66 24,65 24,66 22,57 23,38 22,57	$3p ^4P - 3d ^4P^{\circ}$ $3p ^4P - 3d ^4P^{\circ}$ $3p ^4P - 3d ^4P^{\circ}$ $2p^3 ^2P^{\circ} - 3p ^2P$ $5p ^2P^{\circ} - 3p ^2D$ $2p^3 ^2P^{\circ} - 3p ^2P$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
7519,50 7508,90 7505,31 7237,17 7236,42	7 3 2 7 20	20,92 20,92 21,73 16,33 16,33	$\begin{array}{c} 22,57 \\ 22,57 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
7231 ,32 7144 ,19 7134 ,11 7132 ,45 7125 ,73	18 1 6 1 7	16,33 22,54 22,54 22,53 22,53	18,04 24,27 24,27 24,27 24,27	$3p ^{2}P^{\circ}$ — $3d ^{2}D$ $3p ^{4}D$ — $3d ^{4}F^{\circ}$ $3p ^{4}D$ — $3d ^{4}F^{\circ}$ $3p ^{4}D$ — $3d ^{4}F^{\circ}$ $3p ^{4}D$ — $3d ^{4}F^{\circ}$	$^{1}/_{2}$ $^{-3}/_{2}$ $^{7}/_{2}$ $^{-5}/_{2}$ $^{7}/_{2}$ $^{-7}/_{2}$ $^{5}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{-5}/_{2}$
7119,90 7115,63 7113,04 7112,48 7063,70	12 10 7 6 8	{ 22,54 22,53 22,53 22,53 22,53 22,53 22,90	24 ,28 24 ,27 24 ,27 24 ,27 24 ,27 24 ,65	$3p \ ^4D - 3d \ ^4F^{\circ}$ $3p \ ^4S - 3d \ ^4P^{\circ}$	7/2 - 9/2 $3/2 - 3/2$ $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$
7053,09 7046,26 6812,29 6800,68 6798,11	6 4 3 7 3	22,90 22,90 20,71 20,71 20,70	24,65 24,66 22,53 22,53 22,53	$3p ^4S - 3d ^4P^{\circ}$ $3p ^4S - 3d ^4P^{\circ}$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$	3/2 $3/2$ $3/2$ $1/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $3/2$ $1/2$
6791,47 6787,22 6783,90 6780,64 6779,93	7 6 10 5 8	20,70 20,70 20,71 20,70 20,70	22,53 22,53 22,54 22,53 22,53	$3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$	3/2 - 3/2 $1/2 - 1/2$ $5/2 - 7/2$ $1/2 - 3/2$ $3/2 - 5/2$
6755,16 6750,55 6742,43 6738,62 6734,00	3 8 3 6 2	22,54 22,54 22,53 22,53 22,53	24,37 24,37 24,37 24,37 24,37	$3p \ ^4D - 3d \ ^4D^{\circ}$ $3p \ ^4D - 3d \ ^4D^{\circ}$	7/2 - 5/2 $7/2 - 7/2$ $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 7/2$
6733,58 6731,07 6727,19 6724,56 6723,65	2 5 4 2 1	22,53 22,53 22,53 22,53 22,53 20,84	24,37 24,37 24,37 24,37 24,37 22,68	$3p \ ^4D - 3d \ ^4D^{\circ}$ $4d \ ^2D - 6p \ ^2P^{\circ}$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$ $5/2 - 3/2$
6622,05 6582,88 6578,05 6461,95 6454,77	1 15 18 5 1	20,95 14,45 14,45 20,95 20,95	22,82 16,33 16,33 22,87 22,87	$4f ^2F^{\circ} - 6d ^2D$ $3s ^2S - 3p ^2P^{\circ}$ $3s ^2S - 3p ^2P^{\circ}$ $4f ^2F^{\circ} - 6g ^2G$ $4f ^2F^{\circ} - 6h ^2H$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, λ	I	$E_{\rm H}$, eV	$E_{\rm B}$, eV	Transition	J
6385 ,72 6295 ,20 6290 ,01 6284 ,56 6275 ,79	1 0 1 0	26 ,63 24 ,66 24 ,66 24 ,65 24 ,65	28,58 26,63 26,63 26,63 26,63	4p 4D-5d 4F° 3d 4P°-4p 4D 3d 4P°-4p 4D 3d 4P°-4p 4D 3d 4P°-4p 4D 3d 4P°-4p 4D	7/2 - 9/2 $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
6259,59 6257,18 6256,54 6253,84 6250,74	4 2 2 2 4	20,15 20,15 24,60 24,65 24,60	22,43 22,13 26,58 26,63 26,58	$4p^{2}P^{\circ}-5d^{2}D$ $4p^{2}P^{\circ}-5d^{2}D$ $3d^{2}D^{\circ}-4p^{2}P$ $3d^{4}P^{\circ}-4p^{4}D$ $3d^{2}D^{\circ}-4p^{2}P$	$ \frac{3}{2} - \frac{3}{2}, \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{7}{2} $ $ \frac{5}{2} - \frac{3}{2} $
6246 ,57 6151 ,43 6102 ,56 6098 ,51 6095 ,29	1 4 4 9 7	24,60 20,84 22,57 22,57 22,57	26,58 22,86 24,60 24,60 24,60	$3d^{2}D^{\circ}-4p^{2}P$ $4d^{2}D-6f^{2}F^{\circ}$ $3p^{2}P-3d^{2}D^{\circ}$ $3p^{2}P-3d^{2}D^{\circ}$ $3p^{2}P-3d^{2}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6037,96 5919,45 5914,64 5907,21 5891,59	0 3 4 6 12	27,29 24,66 24,65 24,65 18,04	29,35 26,75 26,75 26,75 20,45	4d ⁴ D°-6f ⁴ F 3d ⁴ P°-4p ⁴ S 3d ⁴ P°-4p ⁴ S 3d ⁴ P°-4p ⁴ S 3d ² D-4p ² P°	$7/_{2}$ $9/_{2}$ $1/_{2}$ $3/_{2}$ $3/_{2}$ $3/_{2}$ $5/_{2}$ $3/_{2}$ $3/_{2}$ $1/_{2}$
5889 ,77 5889 ,27 5856 ,04 5843 ,61 5836 ,35	15 6 5 2 4	18,05 18,04 22,54 22,53 22,53	20 ,15 20 ,15 24 ,65 24 ,65 24 ,65	$3d^{2}D-4p^{2}P^{c} \ 3d^{2}D-4p^{2}P^{c} \ 3p^{4}D-3d^{4}P^{c} \ 3p^{4}D-3d^{4}P^{c} \ 3p^{4}D-3d^{4}P^{c}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array}$
5827,85 5823,14 5818,30 5791,77 5713,56	2 2 2 1 0	22,53 { 22,53 22,53 22,53 27,23 24,65	24,65 24,66 24,65 24,66 29,37 26,83	$3p ^4D - 3d ^4P^{\circ}$ $3p ^4D - 3d ^4P^{\circ}$ $3p ^4D - 3d ^4P^{\circ}$ $3p ^4D - 3d ^4P^{\circ}$ $4d ^4F^{\circ} - 6f ^4G$ $3d ^4P^{\circ} - 4p ^4P$	3/2 $3/2$ $3/2$ $1/2$
5712 ,51 5708 ,03 5701 ,16 5694 ,30 5662 ,47	1 0 2 2 12	24,66 24,65 { 24,65 24,65 24,65 20,71	26,83 26,83 26,83 26,83 26,83 22,90	3d ⁴ P°—4p ⁴ P 3d ⁴ P°—4p ⁴ P 3d ⁴ P°—4p ⁴ P 3d ⁴ P°—4p ⁴ P 3d ⁴ P°—4p ⁴ P 3s ⁴ P°—3p ⁴ S	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
5648,07 5640,55 5537,61 5535,35 5490,16	10 8 3 5 1	20,71 20,70 19,49 19,49 24,37	22,90 22,90 21,73 21,73 26,63	$3s ext{ }^{4}P^{\circ} - 3p ext{ }^{4}S$ $3s ext{ }^{4}P^{\circ} - 3p ext{ }^{4}S$ $4s ext{ }^{2}S - 5p ext{ }^{2}P^{\circ}$ $4s ext{ }^{2}S - 5p ext{ }^{2}P^{\circ}$ $3d ext{ }^{4}D^{\circ} - 4p ext{ }^{4}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5488,95 5485,90 5483,35 5478,59 5368,58	1 2 1 4 1	24,37 24,37 24,37 24,37 20,84	26,63 26,63 26,63 26,63 23,45	3d ⁴ D°—4p ⁴ D 3d ⁴ D°—4p ⁴ D 3d ⁴ D°—4p ⁴ D 3d ⁴ D°—4p ⁴ D 4d ² D—7p ² P°	$\begin{array}{c} 7/_{2} - 5/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 7/_{2} - 7/_{2} \\ 3/_{2}, 5/_{2} - 1/_{2}, 3/_{2} \end{array}$
5367,67 5342,40 5339,85 5334,79 5332,89	1 2 1 6 4	25,99 20,95 20,95 20,15 20,15	28,30 23,27 23,27 22,47 22,47	$4s {}^{4}P^{\circ} - 5p {}^{4}D$ $4f {}^{2}F^{\circ} - 7g {}^{2}G$ $4f {}^{2}F^{\circ} - 7h {}^{2}H$ $4p {}^{2}P^{\circ} - 6s {}^{2}S$ $4p {}^{2}P^{\circ} - 6s {}^{2}S$	$\begin{array}{c} 5/_{2} - 7/_{2} \\ 7/_{2} - 7/_{2}, & 9/_{2} \\ 7/_{2} - 9/_{2}, & 9/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
5290,09 5286,47 5259,71	1 = 1	26,63 26,63 26,63 24,27 24,27	28,97 28,97 28,98 26,63 26,63	4p 4D—6s 4P° 4p 4D—6s 4P° 4p 4D—6s 4P° 3d 4F°—4p 4D 3d 4F°—4p 4D	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
5259 ,06 5257 ,24	5 7	24 ,27 24 ,28	26 ,63 26 ,63	3d ⁴ F°—4p ⁴ D 3d ⁴ F°—4p ⁴ D	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{9}{2}$ $\frac{7}{2}$
5256,09 5253,57 5249,51 5151,09 5145,16	2 4 2 13 15	24 ,27 24 ,27 24 ,27 20 ,71 20 ,71	26,63 26,63 26,63 23,11 23,12	3d ⁴ F°-4p ⁴ D 3d ⁴ F°-4p ⁴ D 3d ⁴ F°-4p ⁴ D 3s ⁴ P°-3p ⁴ P 3s ⁴ P°-3p ⁴ P	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{5}{2} $
5143,49 5139,17 5137,26 5133,28 5132,94	12 9 7 12 12	20,70 20,70 20,70 20,70 20,70	23,11 23,11 23,11 23,12 23,11	3s ⁴ P°—3p ⁴ P 3s ⁴ P°—3p ⁴ P 3s ⁴ P°—3p ⁴ P 3s ⁴ P°—3p ⁴ P 3s ⁴ P°—3p ⁴ P	3/2 - 1/2 $3/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$
5126,93 5125,20 5122,15 5121,82 5120,10	2 4 2 5 3	$20,15 \\ 20,15 \\ 20,84 \\ 20,15 \\ \{ 25,07 \\ 20,15 $	22,57 22,57 23,26 22,57 27,49 22,57	$4p^{2}P^{\circ}-3p^{2}P$ $4p^{2}P^{\circ}-3p^{2}P$ $4d^{2}D-7f^{2}F^{\circ}$ $4p^{2}P^{\circ}-3p^{2}P$ $3d^{2}P^{\circ}-4f^{4}D$ $4p^{2}P^{\circ}-3p^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2, 5/2 - 5/2, 7/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
5119,45 5116,75 5114,26 5113,69 5107,91	4 2 4 4 1	25,07 25,07 25,07 25,07 25,07	27,49 27,49 27,49 27,49 27,49	$\begin{array}{c} 3d\ ^{2}P^{\circ}-4f\ ^{2}D\\ 3d\ ^{2}P^{\circ}-4f\ ^{4}D\\ 3d\ ^{2}P^{\circ}-4f\ ^{2}D\\ 3d\ ^{2}P^{\circ}-4f\ ^{4}D\\ 3d\ ^{2}P^{\circ}-4f\ ^{2}D\\ 3d\ ^{2}P^{\circ}-4f\ ^{2}D\\ \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5049 ,24 5047 ,11 5044 ,98 5044 ,35 5041 ,76	2 3 1 5 2	24,37 24,37 24,37 24,37 24,37	26,83 26,83 26,83 26,83 26,83	$3d ^4D^{\circ} - 4p ^4P$ $3d ^4D^{\circ} - 4p ^4P$ $3d ^4D^{\circ} - 4p ^4P$ $3d ^4D^{\circ} - 4p ^4P$ $3d ^4D^{\circ} - 4p ^4P$	$\begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \end{array}$
5040 ,74 5035 ,91 5032 ,07 4964 ,73 4959 ,92	2 5 7 4 1	20,92 20,92 20,92 20,92 22,57 22,57	23,38 23,38 23,38 25,07 25,07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
4958,67 4953,85 4867,07 4862,57 4802,70	1 3 2 4 1	22,57 22,57 19,49 19,49 20,95	25,07 25,07 22,09 22,10 23,53	3p ² P-3d ² P° 3p ² P-3d ² P° 4s ² S-3s ² P° 4s ² S-3s ² P° 4f ² F°-8g ² G	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2, 7/2 - 7/2, 9/2 \end{array}$
4747,28 4744,77 4737,97 4735,46 4734,60	2 5 3 2 2	13,72 13,72 13,71 13,71 24,79	16,33 16,33 16,33 16,33 27,41	$2p^{2} {}^{2}P - 3p {}^{2}P^{\circ} \ 2p^{2} {}^{2}P - 3p {}^{2}P^{\circ} \ 3d {}^{2}F^{\circ} - 4f {}^{2}F$	3/2 - 1/2 $3/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$ $7/2 - 7/2$
4727,41 4638,91 4637,63 4629,98 4627,44	2 2 1 2	24,79 20,15 20,15 24,79 24,79	27,41 22,82 22,82 27,47 27,47	3d ² F°—4f ² F 4p ² P°—6d ² D 4p ² P°—6d ² D 3d ² F°—4f ⁴ G 3d ² F°—4f ² G	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \end{array} $
4625,56 4619,23 4618,40 4413,255 4411,506	3 8 6 1 7	24;79 24,79 24,79 24,60 24,60	27,47 27,48 27,47 27,41 27,41	3d ² F°—4f ⁴ G 3d ² F°—4f ² G 3d ² F°—4f ² G 3d ² D°—4f ² F 3d ² D°—4f ² F	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4411 ,163 4409 ,979 4409 ,161	6 5 2	24,60 24,60 24,60	$27,41 \\ 27,41 \\ 27,41$	3d ² D°—4f ² F 3d ² D°—4f ⁴ F 3d ² D°—4f ⁴ F	$\frac{3}{2}$ _2 - $\frac{5}{2}$ _2 - $\frac{5}{2}$ _2 - $\frac{7}{2}$ _2 - $\frac{5}{2}$ _2 - $\frac{5}{2}$

λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}}$, eV	Transition	J
4376 ,562 4375 ,009	5 4	24,65 24,66	27 ,49 27 ,49	3d ⁴ P°—4f ² D 3d ⁴ P°—4f ⁴ D	$^{3/_{2}-^{5/_{2}}}_{^{1/_{2}-^{3/_{2}}}}$
4374 ,272 4372 ,487 4372 ,350	9 7 6	$ \begin{array}{c} 24,65 \\ 24,65 \\ 24,66 \\ 24,66 \\ 24,65 \end{array} $	27,49 27,49 27,49 27,49	$3d {}^{4}P^{\circ}$ — $4f {}^{4}D$ $3d {}^{4}P^{\circ}$ — $4f {}^{2}D$ $3d {}^{4}P^{\circ}$ — $4f {}^{4}D$ $3d {}^{4}P^{\circ}$ — $4f {}^{4}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4370 ,661 4369 ,857	1 2	24,66 24,65	27,49 27,49	$3d {}^{4}P^{\circ} - 4f {}^{2}D$ $3d {}^{4}P^{\circ} - 4f {}^{4}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
4368 ,263 4368 ,047 4326 ,156 4325 ,827 4323 ,102	4 1 5 4 3	24,65 24,65 23,11 23,12 23,11	27,49 27,49 25,98 25,98 25,98	$3d\ ^4P^{\circ}-4f\ ^4D$ $3d\ ^4P^{\circ}-4f\ ^2D$ $3p\ ^4P-4s\ ^4P^{\circ}$ $3p\ ^4P-4s\ ^4P^{\circ}$ $3p\ ^4P-4s\ ^4P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4321,647 4318,600 4317,260 4313,100 4307,59	3 5 8 6 2	23,11 23,11 23,12 23,11 20,15	25,98 25,98 25,98 25,98 23,03	$3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ 4p ^2P^{\circ} - 7s ^2S$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
4306 ,33 4295 ,920 4291 ,819 4289 ,876 4285 ,704	1 4 3 2 3	20,45 24,60 24,60 24,60 24,60	23,03 27,49 27,49 27,49 27,49	$4p ^2P^{\circ} - 7s ^2S$ $3d ^2D^{\circ} - 4f ^2D$ $3d ^2D^{\circ} - 4f ^4D$ $3d ^2D^{\circ} - 4f ^4D$ $3d ^2D^{\circ} - 4f ^4D$ $3d ^2D^{\circ} - 4f ^2D$	$\begin{array}{c} {}^{1}/{}_{2} - {}^{1}/{}_{2} \\ {}^{5}/{}_{2} - {}^{5}/{}_{2} \\ {}^{5}/{}_{2} - {}^{3}/{}_{2}, \ {}^{5}/{}_{2} \\ {}^{3}/{}_{2} - {}^{3}/{}_{2}, \ {}^{5}/{}_{2} \\ {}^{3}/{}_{2} - {}^{3}/{}_{2} \end{array}$
4267,258 4267,003 4077,778 4077,625 4076,83	20 18 4 2	18,05 18,04 24,37 24,37 24,37 24,37	20,95 20,95 27,41 27,41 27,41 27,41	$3d^{2}D-4f^{2}F^{\circ}$ $3d^{2}D-4f^{2}F^{\circ}$ $3d^{4}D^{\circ}-4f^{2}F$ $3d^{4}D^{\circ}-4f^{2}F$ $3d^{4}D^{\circ}-4f^{4}F$ $3d^{4}D^{\circ}-4f^{4}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
4076,526 4076,251 4076,142 4075,851 4075,395	4 3 5 12 4	24,37 24,37 24,37 24,37 24,37 24,37	27,41 27,41 27,41 27,41 27,41 27,41	$3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^2F$ $3d\ ^4D^{\circ}-4f\ ^2F$ $3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^4F$	7/2 $7/2$ $3/2$ $5/2$ $5/2$ $7/2$ $5/2$
4074 ,845 4074 ,518 4021 ,167 4017 ,278 4009 ,884	8 10 3 5 7	24,37 24,37 24,37 22,90 22,90 22,90	27,41 27,41 27,41 25,98 25,98 25,99	$3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^4F$ $3d\ ^4D^{\circ}-4f\ ^4F$ $3p\ ^4S-4s\ ^4P^{\circ}$ $3p\ ^4S-4s\ ^4P^{\circ}$ $3p\ ^4S-4s\ ^4P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3980 ,323 3978 ,759 3977 ,269 3975 ,953	8 4 5 1	$ \begin{array}{c} 24,37 \\ 24,37 \\ 24,37 \\ 24,37 \\ 24,37 \\ 24,37 \end{array} $	27,49 27,49 27,49 27,49 27,49	3d ⁴ D°4f ⁴ D 3d ⁴ D°4f ² D 3d ⁴ D°4f ⁴ D 3d ⁴ D°4f ² D 3d ⁴ D°4f ² D	$7/_{2}$ — $7/_{2}$ $7/_{2}$ — $5/_{2}$ $5/_{2}$ — $7/_{2}$ $5/_{2}$ — $5/_{2}$ $3/_{2}$ — $5/_{2}$
3975 ,341 3973 ,760 3972 ,439 3971 ,574 3970 ,386 3969 ,520	2 7 6 2 4 3	24,37 24,37 24,37 24,37 24,37 24,37 24,37	27,49 27,49 27,49 27,49 27,49 27,49 27,49	3d ⁴ D°-4f ⁴ D 3d ⁴ D°-4f ⁴ D 3d ⁴ D -4f ⁴ D 3d ⁴ D°-4f ⁴ D 3d ⁴ D°-4f ⁴ D 3d ⁴ D°-4f ² D 3d ⁴ D°-4f ⁴ D	7/2 - 5/2 $5/2 - 3/2$, $5/2$ $3/2 - 3/2$, $5/2$ $1/2 - 3/2$ $3/2 - 1/2$ $5/2 - 3/2$ $1/2 - 1/2$
3968 ,92 3953 ,95 3952 ,679 96	0 0 1	24 ,37 24 ,28 24 ,28	27 ,49 27 ,41 27 ,41	3d ⁴ D°—4f ² D 3d ⁴ F°—4f ² F 3d ⁴ F°—4f ⁴ F	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{9}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{7}{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3952,058 3949,530	9	24 ,28 24 ,27	27 ,41 27 ,41	3d ⁴ F°—4f ⁴ F 3d ⁴ F°—4f ² F	9/2—9/2 7/2—7/2
3949 ,373 3948 ,333	1 6	24,27 $24,27$ $24,27$	27,41 27,41 27,41	3d ⁴ F°—4f ⁴ F 3d ⁴ F°—4f ⁴ F 3d ⁴ F°—4f ² F	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3947 ,715 3947 ,079 3946 ,429	6 2 1	{ 24,27 24,27 24,27 24,27	27,41 27,41 27,41 27,41	$3d\ ^{4}F^{\circ}-4f\ ^{4}F$ $3d\ ^{4}F^{\circ}-4f\ ^{4}F$ $3d\ ^{4}F^{\circ}-4f\ ^{2}F$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
3946 ,278 3945 ,197 3945 ,003 3944 ,193 3920 ,693	5 4 5 3 18	24,27 24,27 24,27 24,27 24,27 16,33	27,41 27,41 27,41 27,41 27,41 19,49	$3d\ ^4F^{\circ}$ — $4f\ ^4F$ $3d\ ^4F^{\circ}$ — $4f\ ^4F$ $3d\ ^4F^{\circ}$ — $4f\ ^4F$ $3d\ ^4F^{\circ}$ — $4f\ ^4F$ $3p\ ^2P^{\circ}$ — $4s\ ^2S$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3918,978 3883,824 3880,588 3879,640 3878,028	15 1 7 7 7	16,33 24,28 24,28 24,27 24,27	19 ,49 27 ,47 27 ,47 27 ,47 27 ,47	3p 2P°—4s 2S 3d 4F°—4f 4G 3d 4F°—4f 4G 3d 4F°—4f 4G 3d 4F°—4f 4G	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3876 ,664 3876 ,408 3876 ,187 3876 ,055 3874 ,666	12 12 12 9 2	24,27 24,27 24,28 24,27 24,27	27 ,47 27 ,47 27 ,47 27 ,47 27 ,47	3d ⁴ F°—4f ⁴ G 3d ⁴ F°—4f ⁴ G 3d ⁴ F°—4f ⁴ G 3d ⁴ F°—4f ⁴ G 3d ⁴ F°—4f ² G	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3873,067 3871,669 3868,874 3862,181 3856,62	0 7 6 2 0	24,28 24,27 24,27 24,28 24,27	27,48 27,47 27,48 27,49 27,49	3d ⁴ F°-4f ² G 3d ⁴ F°-4f ² G 3d ⁴ F°-4f ² G 3d ⁴ F°-4f ⁴ D 3d ⁴ F°-4f ² D	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
3836,683 3835,730 3831,743 3590,862 3589,657	2 6 8 8 9	$20,15$ $20,15$ $20,15$ $20,53$ $\{22,53$ $22,53$ $22,54$	23,38 23,38 23,38 25,98 25,98 25,99	$4p\ ^{2}P^{\circ}-3p\ ^{2}D$ $4p\ ^{2}P^{\circ}-3p\ ^{2}D$ $4p\ ^{2}P^{\circ}-3p\ ^{2}D$ $3p\ ^{4}D-4s\ ^{4}P^{\circ}$ $3p\ ^{4}D-4s\ ^{4}P^{\circ}$ $3p\ ^{4}D-4s\ ^{4}P^{\circ}$	3/2 $3/2$ $1/2$ $3/2$ $3/2$ $5/2$ $5/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
3588 ,915 3587 ,657 3585 ,809 3584 ,977 3581 ,763	5 6 3 7 3	22,53 22,53 22,53 22,53 22,53 22,53	25,98 25,98 25,98 25,99 25,99	$3p \ ^4D - 4s \ ^4P^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
3406 ,361 3404 ,33 3403 ,66 3401 ,53 3393 ,946	2 1 1 0 1	25,07 25,07 25,07 25,07 24,60	28,69 28,70 28,70 28,70 28,25	$3d\ ^{2}P^{\circ}-5f\ ^{2}D$ $3d\ ^{2}P^{\circ}-5f\ ^{2}D$ $3d\ ^{2}P^{\circ}-5f\ ^{4}D$ $3d\ ^{2}P^{\circ}-5f\ ^{2}D$ $3d\ ^{2}P^{\circ}-5f\ ^{2}D$ $3d\ ^{2}D^{\circ}-5p\ ^{2}P$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2, & 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
3392 ,146 3361 ,721 3361 ,051 3360 ,891 3357 ,19	2 6 8 3 0	24,60 18,04 18,05 18,04 24,66	28,25 21,73 21,73 21,73 28,35	$3d\ ^2D^{\circ}-5p\ ^2P$ $3d\ ^2D-5p\ ^2P^{\circ}$ $3d\ ^2D-5p\ ^2P^{\circ}$ $3d\ ^2D-5p\ ^2P^{\circ}$ $3d\ ^2D-5p\ ^2P^{\circ}$ $3d\ ^4P^{\circ}-5p\ ^4S$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3355,690 3353,302 3174,58 3172,62 3170,03	1 2 0 1 2	24,65 24,65 24,79 24,79 24,79	28,35 28,35 28,70 28,70 28,70	$3d\ ^4P^{\circ}$ — $5p\ ^4S$ $3d\ ^4P^{\circ}$ — $5p\ ^4S$ $3d\ ^2F^{\circ}$ — $5f\ ^4G$ $3d\ ^2F^{\circ}$ — $5f\ ^4G$ $3d\ ^2F^{\circ}$ — $5f\ ^2G$	3/2 - 3/2 $5/2 - 3/2$ $7/2 - 9/2$ $5/2 - 7/2$ $7/2 - 9/2$
3169,66 3167,931 3165,974 3165,467 3157,13	1 8 4 9 0	24,79 18,65 18,65 18,65 24,37	28 ,70 22 ,57 22 ,57 22 ,57 28 ,30	$3d\ ^2F^{\circ}-5f\ ^2G\ 2p^3\ ^2D^{\circ}-3p\ ^2P\ 2p^3\ ^2D^{\circ}-3p\ ^2P\ 2p^3\ ^2D^{\circ}-3p\ ^2P\ 3d\ ^4D^{\circ}-5p\ ^4D$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \end{array} $

	λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
	3142,04 3137,92 3124,133 3122,086 3100,570	0 1 2 1 2	20,84 20,84 23,38 23,38 18,05	24,79 24,79 27,35 27,35 22,10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
	3087 ,90 3086 ,903	0 1	24,37 24,37 24,27	28,38 28,38 28,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \end{array}$
	3083 ,052 3082 ,381	2	24,27 24,27 24,28	28 ,29 28 ,29 28 ,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	3060 ,64 3059 ,83 3059 ,091	1 0 3	24,65 24,66 24,65	28,69 28,70 28,70	$3d {}^{4}P^{\circ} - 5f {}^{2}D$ $3d {}^{4}P^{\circ} - 5f {}^{4}D$ $3d {}^{4}P^{\circ} - 5f {}^{4}D$	$\frac{3}{2}$ — $\frac{5}{2}$ $\frac{1}{2}$ — $\frac{3}{2}$ $\frac{5}{2}$ — $\frac{7}{2}$
	3058 ,45	2	{ 24,65 24,66 24,66	28 ,70 28 ,70 28 ,70	3d 4P°—5f 4D 3d 4P°—5f 4D 3d 4P°—5f 2D	$\frac{3}{2}$ $\frac{3}{2}$, $\frac{5}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
	3056 ,85 3049 ,671	3	1 24,65 24,60	28 ,70 28 ,67	$3d {}^{4}P^{\circ} - 5f {}^{4}D$ $3d {}^{2}D^{\circ} - 5f {}^{2}F$	$\frac{5}{2}$ $\frac{3}{2}$, $\frac{5}{2}$ $\frac{5}{2}$
	3049 ,398 3048 ,933 3048 ,69 3040 ,512 3039 ,714	$\begin{array}{c} 3 \\ 2 \\ 0 \\ 2 \\ 3 \end{array}$	24,60 24,60 24,60 23,38 23,38	28,67 28,67 28,67 27,46 27,46	$3d^{2}D^{\circ}-5f^{2}F$ $3d^{2}D^{\circ}-5f^{4}F$ $3d^{2}D^{\circ}-5f^{4}F$ $3p^{2}D-4d^{2}F^{\circ}$ $3p^{2}D-4d^{2}F^{\circ}$	3/2 - 5/2 $5/2 - 7/2$ $3/2 - 5/2$ $3/2 - 5/2$ $5/2 - 7/2$
	2992 ,648 2969 ,59 2968 ,836 2967 ,868 2967 ,629	18 0 2 7 3	18,04 23,12 23,12 23,12 23,11	22,19 27,29 27,29 27,29 27,29	$3d^{2}D-5f^{2}F^{\circ} \ 3p^{4}P-4d^{4}D^{\circ} \ 3p^{4}P-4d^{4}D^{\circ} \ 3p^{4}P-4d^{4}D^{\circ} \ 3p^{4}P-4d^{4}D^{\circ} \ 3p^{4}P-4d^{4}D^{\circ}$	3/2, $5/2 - 5/2$, $7/25/2 - 3/25/2 - 5/25/2 - 5/25/2 - 7/23/2 - 3/2$
	2966 ,871 2966 ,655 2966 ,187 2910 ,729 2908 ,957	5 3 3 2 {	23,11 23,11 23,11 23,12 23,12 23,11	27,29 27,29 27,29 27,38 27,38 27,38	$3p \ ^4P-4d \ ^4D^\circ \ 3p \ ^4P-4d \ ^4D^\circ \ 3p \ ^4P-4d \ ^4D^\circ \ 3p \ ^4P-4d \ ^4P^\circ $	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
į	2907 ,09 2906 ,011 2905 ,715	$\begin{array}{c}1\\2\\2\end{array}$	23,11 23,11 23,11	27,38 27,38 27,38	$3p \ ^4P - 4d \ ^4P^{\circ}$ $3p \ ^4P - 4d \ ^4P^{\circ}$ $3p \ ^4P - 4d \ ^4P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2	2885 ,496	в {	24 ,37 24 ,37	28 ,67 28 ,67 28 ,67 28 ,67	$3d^{4}D^{\circ} - 5f^{2}F$ $3d^{4}D^{\circ} - 5f^{2}F$ $3d^{4}D^{\circ} - 5f^{4}F$ $3d^{4}D^{\circ} - 5f^{4}F$	$\frac{3}{7} \frac{5}{2} \frac{5}{2}$
	2884 ,808	4 {	24 ,37 24 ,37	28 ,67 28 ,67	3d ⁴ D°—5f ⁴ F 3d ⁴ D°—5f ⁴ F 3d ⁴ D°—5f ⁴ F	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
$\frac{2}{2}$	2861,060 2858,00 2837,603 836,710 822,812	1 18 20	24 ,37 11 ,96 11 ,96	28 ,70 28 ,70 16 ,33 16 ,33 28 ,67	$3d ^4D^{\circ} - 5f ^4D$ $3d ^4D^{\circ} - 5f ^4D$ $2p^2 ^2S - 3p ^2P^{\circ}$ $2p^2 ^2S - 3p ^2P^{\circ}$ $3d ^4F^{\circ} - 5f ^4F$	7/2 - 7/2 $5/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$ $9/2 - 9/2$
	821 ,54	1 \ 2	24,27	28 ,67 28 ,67 28 ,67	3d 4F°—5f 4F 3d 4F°—5f 2F	$\frac{7}{2}$ _5/2 $\frac{7}{2}$ _7/2 $\frac{7}{2}$ _7/2
28	820,70 820,00 819,13	1 2	24 ,27	28 ,67 28 ,67 28 ,67	3d ⁴ F°—5f ⁴ F 3d ⁴ F°—5f ² F 3d ⁴ F°—5f ⁴ F 3d ⁴ F°—5f ⁴ F	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
28	303 ,45 302 ,95	0 2	24,28 2	28,67 28,70	3d ⁴ F°—5f ⁴ F 3d ⁴ F°—5f ⁴ G	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	302 ,39			28 ,70 28 ,70	3d ⁴ F°—5f ⁴ G 3d ⁴ F°—5f ⁴ G	$\frac{7}{2}$ $\frac{7}{2}$ _5 $\frac{5}{2}$ $\frac{5}{2}$

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
2801,43	5	{ 24,27	28,70	$3d^{4}F^{\circ} - 5f^{4}G$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2801,21	5	24,27 24,27	28 ,70 28 ,70	3d ⁴ F°—5f ⁴ G 3d ⁴ F°—5f ⁴ G	$\frac{3}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{9}{2}$ $\frac{11}{2}$
2799 ,15	1	24,28	28 ,70 28 ,70	3d 4F°—5f 4G 3d 4F°—5f 2G	$\frac{9}{2}$ $\frac{11}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2797,70	1	24,27	28,70	$3d ^4F^{\circ} - 5f ^2G$	⁷ / ₂ — ⁹ / ₂
2767 ,673 2766 ,118	3 2	22,90 22,90	27 ,38 27 ,38	3p ⁴ S—4d ⁴ P° 3p ⁴ S—4d ⁴ P°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2765 ,120 2747 ,282	$\frac{1}{12}$	22,90 16,33	27,38 20,84	$3p^{4}S-4d^{4}P^{\circ}$ $3p^{2}P^{\circ}-4d^{2}D$	$\frac{3}{2}$ _2_1/2 $\frac{3}{2}$ _3/2, $\frac{5}{2}$
2746 ,488	10	16,33	20,84	$3p ^{2}P^{\circ}-4d ^{2}D$	$^{1}/_{2}$ — $^{1}/_{2}$
2730 ,61 2729 ,213	$\begin{array}{c} 1 \\ 2 \end{array}$	22 , 1 0 22 ,09	$26,58 \ 26,58$	$\frac{3s}{3s} {}^{2}P^{\circ} - 4p {}^{2}P$ $\frac{3s}{3s} {}^{2}P^{\circ} - 4p {}^{2}P$	$\frac{3}{2}$ — $\frac{1}{2}$ $\frac{1}{2}$ — $\frac{1}{2}$ $\frac{3}{2}$ — $\frac{3}{2}$
2728 ,707 2727 ,36	$rac{4}{2}$	22 ,10 22 ,09	26 , 58 26 , 58	$\frac{3s}{3s} \frac{^{2}P}{^{\circ}} - \frac{^{\prime}}{4p} \frac{^{2}P}{^{2}P}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2712,32	0	24,79	29,36	$3d {}^{2}F^{\circ} - 6f {}^{4}G$	7/2—9/2 5/2—7/2
2710,59 2708,4	1 1	79, 24 79, 24	29 ,36 29 ,37	3d ² F°—6f ⁴ G 3d ² F°—6f ² G	⁷ / ₂ — ⁹ / ₂
2669,960	3	79, 24 18,05	29,3 7 22,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
2643 ,427	3	22,54	27,22	$3p ^4D - 4d ^4F^{\circ}$	$7/_{2}$ $-7/_{2}$
2642 ,331 2641 ,425	3 8	22,53 22,53	27,22 27,22	3p 4D—4d 4F° 3p 4D—4d 4F°	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2640,894	5	22 ,54 22 ,53	$\begin{array}{c} 27 \ , 23 \\ 27 \ , 22 \end{array}$	$3p ^4D - 4d ^4F^{\circ} \ 3p ^4D - 4d ^4F^{\circ}$	7/2 - 9/2 $5/2 - 7/2$ $3/2 - 5/2$
2640,560	6	$\left\{ \begin{array}{c} 22,53\\22,53 \end{array} \right.$	27,22 27,22	$3p ^4D - 4d ^4F^{\circ} \ 3p ^4D - 4d ^4F^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2628 ,46	1	24 ,65	29,38	3 <i>d</i> ⁴P°—6f ⁴D	$^{5}/_{2}$ — $^{7}/_{2}$
90, 2622 2620, 20	$\frac{2}{3}$	18 ,65 18 ,65	23 ,38 23 ,38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2612,45	2	24,60 24,60	29 ,35 29 ,35	$\hat{3}d\ ^{2}D^{\circ}-\hat{6}f\ ^{2}F\ 3d\ ^{2}D^{\circ}-\hat{6}f\ ^{2}F$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2605 ,62 2604 ,863	1 4	$22,54 \\ 22,54$	27,29 27,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{7/2}{2} - \frac{5/2}{2}$ $\frac{7}{2} - \frac{7}{2}$
2603 , 7 2 2603 ,161	$\frac{1}{3}$	22,53 22,53	27 ,29 27 ,29	$^{3p}_{3p}^{4}D-^{4}d^{4}D^{\circ}_{3p}^{4}D-^{4}d^{4}D^{\circ}_{3p}$	⁵ / ₂ — ³ / ₂ ⁵ / ₂ — ⁵ / ₂
2602,39	2	$\left\{ \begin{array}{c} 22,53\\22,53 \end{array} \right.$	27 ,29 27 ,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	³ / ₂ — ⁷ / ₂
2602,02	2	22 , 53	27,29 27,29	$3p {}^{4}D$ — $4d {}^{4}D^{\circ}$ $3p {}^{4}D$ — $4d {}^{4}D^{\circ}$	$\begin{array}{c} 3\overline{\smash{\big/}}_2^{} - 1\overline{\smash{\big/}}_2^{} \\ 3\overline{\smash{\big/}}_2^{} - 3\overline{\smash{\big/}}_2 \\ 3\overline{\smash{\big/}}_2^{} - 5\overline{\smash{\big/}}_2 \end{array}$
2601,42	2	$\left\{\begin{array}{c} 22,53\\22,53 \end{array}\right.$	27,29	$3p \stackrel{4D}{=} -4d \stackrel{4D}{=} \circ$	$\frac{1}{2}$ _1/2
$2601,05 \\ 2592,71$	1 1	22,53 22,57	27,29 27,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{3} \frac{3}{2} \frac{3}{2}$
2591,845 2591,410	4 2	22,57 22,57	27,35 27,35	$\frac{3p}{3p} {}^{2}P - 4d {}^{2}D^{\circ} \\ \frac{3p}{2}P - 4d {}^{2}D^{\circ}$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
2574,826	10	18,04	22,86	$3d^{2}D-6f^{2}F^{\circ}$	3/2, $5/2$ $5/2$, $7/2$
2571 , 7 6 25 7 0 ,57	$\frac{1}{2}$	24 ,37	29 ,19	3d ⁴ D°—6p ⁴ P	⁷ / ₂ — ⁵ / ₂
2556 ,12 2555 ,66	0 1	21,73 21,73	$26,58 \ 26,58$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
2554,478	3	21,73	26,58	$5p^{2}P^{\circ}-4p^{2}P$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2547 ,35	1	$\left\{\begin{array}{c} 24,27\\24,27\\24,27\end{array}\right.$	29,13 29,13 29,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{9}{2}$ $\frac{7}{2}$
2546,81	2	24,28	29 ,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
2543,45	$\frac{2}{2}$	$\left\{\begin{array}{c} 23,11\\ 23,12\\ \end{array}\right.$	28,00 28,00	$3p ^4P - 5s ^4P^{\circ}$	$\frac{5}{2}$ $\frac{72}{2}$ $\frac{72}{3}$
2540 ,88 2540 ,39	1 3	23,11 23,12	28 ,00 28 ,00	$3p ^4P - 5s ^4P^{\circ} \ 3p ^4P - 5s ^4P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
,		•	•	-	9

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
2538 ,98	2	23,11	28,00	3p 4P-5s 4P°	³ / ₂ — ⁵ / ₂
2512,065	12	13,72	18,65	$2p^{2} {}^{2}P - 2p^{3} {}^{2}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
2511 ,734	.5	13,72	18,65	$2p^{2} {}^{2}P - 2p^{3} {}^{2}D^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$
2509 ,121	10	13,71	18,65	$2p^{2} {}^{2}P - 2p^{3} {}^{2}D^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
2491 ,37	2	24,37	29,36	$3\dot{d}^4D^{\circ}-6\dot{f}^4F$	⁷ / ₂ — ⁹ / ₂
2490,87	2	$ \begin{cases} 24,37 \\ 24,37 \\ 24,37 \end{cases} $	29 ,35 29 ,35 29 ,35	3d ⁴ D°—6f ⁴ F 3d ⁴ D°—6f ⁴ F 3d ⁴ D°—6f ⁴ F	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2434,81	1	$ \left\{\begin{array}{c} 24,27 \\ 24,27 \\ 24,27 \end{array}\right. $	29,36 29,36	3d ⁴ F°—6f ⁴ G 3d ⁴ F°—6f ⁴ G	$\frac{7}{2}$ $\frac{9}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2434,24	2	24,27 24,28	36, 29 37, 29	3d ⁴ F°—6f ⁴ G 3d ⁴ F°—6f ⁴ G	$\frac{3}{2} - \frac{5}{2}$ $\frac{9}{2} - \frac{11}{2}$ $\frac{3}{2} - \frac{3}{2}$
2433,49	0	22,50	28,00	$3p^4S-5s^4P^\circ$	3/2-3/2
2432,90	ŏ	24,27	29,37	$3d^4F^{\circ}-6f^2G$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
2432,12				$3d^4F^{\circ}$ —6 f^2G	
2432,12 $2430,78$	0 1	24 ,27 22 ,90	29 ,37 28 ,00	$3a^{4}P - 6f^{4}G$ $3p^{4}S - 5s^{4}P^{\circ}$	$\frac{7}{2}$ $\frac{9}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2426,70		18,04	23,00	$3p^{-3}-3s^{-3}P$ $3d^{-2}D-7p^{-2}P^{\circ}$	3/ 5/ 1/ 3/
2402,402	2 7	16,33	21,49	$3p^{2}P^{\circ}-5s^{2}S$	$\frac{3}{2}$, $\frac{5}{2}$ $\frac{1}{2}$, $\frac{3}{2}$ $\frac{3}{2}$
2401,761	5	16,33	21,49	$3p^{-1} - 5s^{-2}S$	$\frac{1}{2}$ $\frac{1}{2}$
2375,08	4			•	
		18,04 22,53	23,26 28,00	$3d\ ^{2}D-7f\ ^{2}F^{\circ}\ 3p\ ^{4}D-5s\ ^{4}P^{\circ}$	$\frac{3}{2}$, $\frac{5}{2}$ $\frac{5}{2}$, $\frac{5}{2}$, $\frac{7}{2}$
2270,20	2	$\left\{ \begin{array}{c} 22,53\\ 22,53 \end{array} \right.$	28,00	$3p ^4D - 5s ^4P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
2269,70	2	22,54	28,00	$3p ^{4}D - 5s ^{4}P^{\circ}$	7/2 - 5/2
2269,36	0	22,53	28,00	$3p^{4}D-5s^{4}P^{\circ}$	$\frac{1}{2} \frac{1}{2} \frac{1}{2}$
2268,91	1	22,53	28,00	$3p^{4}D-5s^{4}P^{\circ}$	$\frac{3}{2} - \frac{3}{2}$
2267,77	0	22,53	28,00	$3p\ ^4D-5s\ ^4P^{\circ}$	⁵ / ₂ — ⁵ / ₂
2256,79	ö	23,00 $23,12$	28,61	$3p^{4}P - 5d^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
	9	123,12	28,61	$3p^{4}P - 5d^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{72}{7}$ $\frac{72}{2}$
2256,19	2	123,11	28,61	$3p ^4P - 5d ^4D^{\circ}$	3/2 - 3/2
2255,68	1	23,11	28,61	$3p^{4}P - 5d^{4}D^{\circ}$	3/2 - 5/2
2255,23	0	23,11	28,61	$3p\ ^4P-5d\ ^4D^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
2242,10	1	23,12	28,64	$3p\ ^{4}P-5d\ ^{4}P^{\circ}$	⁵ / ₂ — ⁵ / ₂
2241,05	1	12, 23 ر	28 ,64	$3p^{-4}P - 5d^{-4}P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$
	•	$\left\{\begin{array}{c} 23,12\\ 23,11\\ \end{array}\right.$	28,64	$3p^{4}P - 5d^{4}P^{\circ}$	$\frac{3}{2}$ _2_5/2 $\frac{3}{2}$ _1/2
2189 ,62 2188 ,72	1	20,92	$\frac{26}{58}$	$2p^{3} 2P^{\circ} - 4p 2P$	$\frac{3}{2}$ $\frac{1}{2}$
2188,72	$\overset{1}{2}$	$20,92 \\ 20,92$	$26,58 \ 26,58$	$2p^{3} 2P^{\circ} - 4p^{2}P$	$\frac{1}{2}$ $\frac{1}{2}$
				$2p^{3} 2P^{\circ} - 4p 2P$	$^{3}/_{2}$ — $^{3}/_{2}$
2187,48	l .,	20,92	26,58	$2p^{3} {}^{2}P^{\circ} - 4p {}^{2}P$	$^{1}/_{2}$ — $^{3}/_{2}$
2174 ,168 2173 ,848	3 5	14 ,45 14 ,45	20,15	$3s {}^{2}S - 4p {}^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$
2156,28	Ĭ	22,90	20 ,15 28 ,64	$\frac{3s}{3p} \frac{^{2}S}{^{4}S} - \frac{4p}{5} \frac{^{2}P^{\circ}}{^{4}P^{\circ}}$	$\frac{1}{3}/2 - \frac{3}{5}/2$
2155,39	Ô	22,90	28,64	$3p^{4}S - 5d^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2154,70	0	22,90		•	
2137,897	5	16,33	28 ,64 22 ,13	$\frac{3p {}^{4}S - 5d {}^{4}P^{\circ}}{3p {}^{2}P^{\circ} - 5d {}^{2}D}$	$\frac{3}{2} - \frac{1}{2} / 2$
2137,417	$\ddot{3}$	16,33	22,13	$3p ^{2}P - 5d ^{2}D$ $3p ^{2}P ^{\circ} - 5d ^{2}D$	$\frac{3}{2}$ $\frac{3}{2}$, $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2114 ,72	Ö	23,12	28,98	$3p^{-1}$ $-3a^{-}D$ $3p^{-4}P$ $-6s^{-4}P^{\circ}$	$\frac{1}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2093,13	1	20,71	26,63	$3s^4P^\circ - 4p^4D$	$\frac{\frac{1}{2}}{\frac{5}{2}}$
		20.70			
2091,63	2 {	20,70	26 ,63 26 .62	$3s ^4P^{\circ} - 4p ^4D$	$\frac{1}{2}/2-\frac{1}{2}/2$
0004 45	,	20,70	26,63 26,63	$\frac{3s}{3s} \frac{^{4}P^{\circ}-4p}{^{4}D} \frac{^{4}D}{4p}$ $\frac{3s}{4}P^{\circ}-4p \frac{^{4}D}{4D}$	$\frac{5}{2}$ $\frac{7}{2}$
2091 ,17	$2 $ $\{$	20,70	26,63	$3s \stackrel{4}{P} \stackrel{4}{-} 4p \stackrel{4}{D}$	$\frac{3}{2} - \frac{5}{2}$
2052,16	2	22,54	28,58	$3p {}^{4}D - 5d {}^{4}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
	(53, 22	28 ,58	$3p\ ^4D - 5d\ ^4F^{\circ}$	$\frac{7}{2}$ $\frac{9}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2051,79	2 {	22,53	28,58	$3p ^4D - 5d ^4F^{\circ}$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{3}{2}-\frac{5}{2}}$
9040 90	, (22,53	28,58	$3p~^4D$ — $5d~^4F^\circ$	1/2 - 3/2
2018 ,38	2	16,33	22,47	$3p^{-2}P^{\circ}$ —6s ^{2}S	$\frac{1}{2} \frac{3}{2}$ $\frac{3}{2} \frac{1}{2}$
2017,94	1	16,33	22,47	$3p^{-2}P^{\circ}-6s^{-2}S$	
1988,51	1	16,33	22,57	$3p^{2}P^{\circ} - 3p^{2}P$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
1988,09	2	16,33	22,57	$3p^{-2}P^{\circ} - 3p^{-2}P$	$\frac{1}{2}$
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λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
1987,76 1987,33	3 1	16,33 16,33	22,57 22,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
1760,81 1760,40 1722,21 1721,66 1720,99	3 4 0 2 1	9,29 9,29 13,72 13,72 13,71	16,33 16,33 20,92 20,92 20,92	$\begin{array}{c} 2p^{22}D - 3p \ ^{2}P^{\circ} \\ 2p^{2} \ ^{2}D - 3p \ ^{2}P^{\circ} \\ 2p^{2} \ ^{2}D - 2p^{3} \ ^{2}P^{\circ} \\ 2p^{2} \ ^{2}P - 2p^{3} \ ^{2}P^{0} \\ 2p^{2} \ ^{2}P - 2p^{3} \ ^{2}P^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
1720 ,44 1335 ,684 1334 ,515 1323 ,916 1141 ,746	0 14 13 8 2	13,71 0,01 0,00 9,29 9,29	20,92 9,29 9,29 18,65 20,15	$2p^{2} {}^{2}P - 2p^{3} {}^{2}P^{\circ} \ 2p {}^{2}P^{\circ} - 2p^{2} {}^{2}D \ 2p {}^{2}P^{\circ} - 2p^{2} {}^{2}D \ 2p^{2} {}^{2}D - 2p^{3} {}^{2}D^{\circ} \ 2p^{2} {}^{2}D - 4p {}^{2}P^{\circ}$	$^{1/2}_{3/2}^{3/2}_{5/2}$ $^{3/2}_{5/2}^{5/2}_{2}$ $^{1/2}_{5/2}^{3/2}_{3/2}$ $^{3/2}_{5/2}^{5/2}_{3/2}^{3/2}$
1141,630 1139,49 1139,330 1138,936 1092,740	3 0 3 2 2	9,29 13,72 13,72 13,71 13,72	20 ,15 24 ,60 24 ,60 24 ,60 25 ,07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
1092,422 1092,240 1091,930 1066,121 1065,883	0 0 1 6 7	13,72 13,71 13,71 9,29 9,29	25,07 25,07 25,07 20,92 20,92	$2p^2 ^2P - 3d ^2P^\circ \ 2p^2 ^2P - 3d ^2P^\circ \ 2p^2 ^2P - 3d ^2P^\circ \ 2p^2 ^2D - 2p^3 ^2P^\circ \ 2p^2 ^2D - 2p^3 ^2P^\circ \ 2p^2 ^2D - 2p^3 ^2P^\circ \ $	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
1063,30 1037,017 1036,330 1010,369 1010,074	0 13 12 10	{ 9,29 9,29 0,01 0,00 5,34 5,33	20,95 20,95 11,96 11,96 17,61 17,61	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2, & 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
1009,854 946,208 945,981 904,468 904,134	9 2 1 10 12	5,33 11,96 11,96 0,01 0,01	17,61 25,07 25,07 13,71 13,72	$\begin{array}{c} 2p^2 {}^4P - 2p^3 {}^4S^\circ \\ 2p^2 {}^2S - 3d {}^2P^\circ \\ 2p^2 {}^2S - 3d {}^2P^\circ \\ 2p {}^2P^\circ - 2p^2 {}^2P \\ 2p {}^2P^\circ - 2p^2 {}^2P \end{array}$	$^{1/2}_{1/2}$ $^{3/2}_{1/2}$ $^{1/2}_{1/2}$ $^{1/2}_{2}$ $^{1/2}_{2}$ $^{3/2}_{2}$ $^{1/2}_{3/2}$
903,950 903,609 858,561 858,094 809,770	11 10 9 8 3	0,00 0,00 0,01 0,00 9,29	13,71 13,72 14,45 14,45 24,60	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2, 5/2 - 3/2 \end{array} $
809,682 806,846 806,684 806,555	4 6 4 7	9,29 5,34 5,33 5,33 5,34 5,33 45,33	24,60 20,70 20,70 20,70 20,70 20,71 20,70	$\begin{array}{c} 2p^2 \ ^2D - 3d \ ^2D^{\circ} \\ 2p^2 \ ^4P - 3s \ ^4P^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
806 ,384 799 ,947 799 ,660 687 ,355 687 ,059 686 ,480	5 4 5 11 10 2	5,33 9,29 9,29 0,01 0,00 {9,29 9,29	20,71 24,79 24,79 18,05 18,04 27,35 27,35	$2^{p^2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2^{p^2} {}^{2}D - 3d {}^{2}F^{\circ}$ $2^{p^2} {}^{2}D - 3d {}^{2}F^{\circ}$ $2^{p} {}^{2}P^{\circ} - 3d {}^{2}D$ $2^{p} {}^{2}P^{\circ} - 3d {}^{2}D$ $2^{p^2} {}^{2}D - 4d {}^{2}D^{\circ}$ $2^{p^2} {}^{2}D - 4d {}^{2}D^{\circ}$	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$ $5/2 - 5/2$
651,342 651,269 651,216 641,875 641,772	8 7 7 6 6	5,34 5,33 5,33 5,34 5,34 { 5,34	24,37 24,37 24,37 24,65 24,65 24,65	$\begin{array}{c} 2p^2 \ ^4P - 3d \ ^4D^{\circ} \\ 2p^2 \ ^4P - 3d \ ^4D^{\circ} \\ 2p^2 \ ^4P - 3d \ ^4D \\ 2p^2 \ ^4P - 3d \ ^4P^{\circ} \\ 2p^2 \ ^4P - 3d \ ^4P^{\circ} \\ 2p^2 \ ^4P - 3d \ ^4P^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2, 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
641,591	6	{ 5,33 5,33	24 ,66 24 ,65	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ} \\ 2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{3}{2}$ _1/2 $\frac{1}{2}$ _2 $\frac{3}{2}$
636 ,247 635 ,988	4 3	0,01 0,00	19 ,49 19 ,49	$2p \ ^{2}P^{\circ}$ $-4s \ ^{2}S$ $2p \ ^{2}P^{\circ}$ $-4s \ ^{2}S$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
600,532	2	$\left\{\begin{array}{c} 5,33\\5,32\end{array}\right.$	25,98 25,98	$2p^{2} {}^{4}P$ — $4s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P$ — $4s {}^{4}P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
600,369	3	5,33	25,99 25,99	$2p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
600 ,265 595 ,032	1 7	5,32 0,01	25 ,99 20 ,84	$\frac{2p^2}{2p}$ $\frac{4P}{4s}$ $\frac{4P}{2D}$ $\frac{4P}{2D}$	$\frac{3}{2}$ $\frac{5}{2}$
594,808	$\dot{6}$	0,00	20,84	$2p^{-1}$ $-4u^{-1}D$ $2p^{-2}P^{\circ}$ $-4d^{-2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
577,108	$\overset{\circ}{2}$	0,00	20,04	$2p^{-1} - 4a^{-1}D$ $2p^{-2}P^{\circ} - 5s^{-2}S$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{3}{2}-\frac{1}{2}}$
576,900	1	00,00	21,49	$\frac{2p}{2p} {}^{2}P^{\circ} - 5s {}^{2}S$	$\frac{1}{2} \frac{1}{2} \frac{1}{2}$
564,645	5	$ \begin{cases} 5,34 \\ 5,33 \\ 5,33 \end{cases}$	27 ,29 27 ,29 27 ,29	$2p^2\ ^4P$ — $4d\ ^4D^\circ \ 2p^2\ ^4P$ — $4d\ ^4D^\circ \ 2p^2\ ^4P$ — $4d\ ^4D^\circ \ $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
562,577	3	5,34	27,38	$2p^{2} \stackrel{1}{}^{4}P - 4d \stackrel{D}{}^{4}P^{\circ}$	$\frac{\frac{1}{2}}{\frac{5}{2}}$, $\frac{5}{2}$
562,498	3	$\begin{cases} 5,34 \\ 5,33 \end{cases}$	27,38 27,38	$2p^{2} {}^{4}P$ — $4d {}^{4}P^{\circ}$ $2p^{2} {}^{4}P$ — $4d {}^{4}P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
562,355	3	{ 5,33 5,33	27,38	$2p^2 ^4P - 4d ^4P^\circ$	$\frac{3}{1} \frac{1}{2} - \frac{1}{2} \frac{1}{2}$
560,443	5	0,01	27,38 22,13	$\frac{2p^2}{2} \frac{^4P}{^2P} - \frac{4d}{5} \frac{^4P}{^2D}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
560,244	4	00,0	22,13	$2p ^{2}P^{\circ}$ — $5d ^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
551 ,894	0	0,01	22,47	$\frac{1}{2p} {}^{2}P^{\circ} - 6s {}^{2}S$	$\frac{3}{2}$ _1/2
549,568	3	0,01	22 ,57	$2p^{2}P^{\circ}-3p^{2}P$	$\frac{3}{2} \frac{1}{2} \frac{1}{2}$
549,507	5	0,01	22 ,57	$2p^{2}P^{\circ}-3p^{2}P$	3/2 - 3/2
549,375	4	0,00	22 ,57	$2p^{2}P^{\circ}-3p^{2}P$	$^{1}/_{2}$ — $^{1}/_{2}$
549,317	3	0,00 5,33	22,57 28,00	$\frac{2p}{2p^2} \frac{^2P}{^4P} - \frac{3p}{5s} \frac{^2P}{^4P}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
547 ,288	0	$\begin{cases} 5,33 \\ 5,32 \end{cases}$	28,00	$\frac{2p}{2p^2} \frac{1}{^4P} - \frac{5s}{5s} \frac{1}{^4P} \circ$	$\frac{3}{2}$ $\frac{1}{2}$
547,169	0	5,33	28,00	$2p^{2} {}^{4}P - 5s {}^{4}P^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
543,475	3	0,01	22 ,82	$2p^{-2}P^{\circ}-6d^{-2}D$	$\frac{3}{2}$ $\frac{5}{2}$
543,291	2	0,00	22,82	$2p^{2}P^{\circ}-6d^{2}D$	¹ / ₂ — ³ / ₂
532 ,716	3	$\left\{ \begin{array}{c} 5,34 \\ 5,33 \end{array} \right.$	28,61 28,61	$\frac{2p^2}{2p^2}\frac{4P}{4P} - 5d\frac{4D}{4D}^{\circ}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
531 ,917	1	5,34	28 ,64	$2p^2 ^4P - 5d ^4P^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$
531 ,775	0	$\left\{\begin{array}{c}5,33\\5,33\end{array}\right.$	28 ,64 28 ,64	$\frac{2p^2}{2p^2}\frac{4P}{4P}-5d\frac{4P}{4P}^{\circ}$ $\frac{2p^2}{4P}-5d\frac{4P}{4P}^{\circ}$	$\frac{3}{2}$ _2_1/2 1/2_3/2
530,386	4	0,01	23,38	$2p^{2}P^{\circ}-3p^{2}D$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{3}{2}-\frac{5}{2}}$
530,290	3	00,00	23 ,38	$2p^{2}P^{\circ}-3p^{2}D$	$\frac{1}{2} \frac{1}{2} \frac{3}{2}$
466,536	0	0,01	26,58	$2p^{2}P^{\circ}-4p^{2}P$	$^{3}/_{2}$ — $^{1}/_{2}$
466 ,492 466 ,404	$rac{2}{1}$	0,01	26,58	$2p^{-2}P^{\circ}-4p^{-2}P$	$3/_{2}^{-}$ $3/_{2}^{-}$
466,358	$\stackrel{1}{0}$	0,00	26,58	$2p^{2}P^{\circ}-4p^{2}P$	$\frac{1}{2} - \frac{1}{2}$
438,930	1	0,00 0,01	26,58 28,25	$\frac{2p}{2p} \frac{^{2}P^{\circ}}{-4p} \frac{^{4}p}{^{2}P} = \frac{^{2}P}{2p} \frac{^{2}P^{\circ}}{-5p} \frac{^{2}P}{^{2}P}$	$\frac{1}{2} - \frac{3}{2}$
,	•	0,01	20,20	2p -r - op 2p	$3/_{2}$ $-3/_{2}$

C III, ground state $1s^2 2s^2 {}^1S_0$ Ionization potential 386213,9 cm $^{-1}$; 47,881 eV

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
9717,73	2	32,49	33 ,47	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	2-2
9715,11	5	32,49	33 ,47	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	2-3
9706,44	2	32,49	33 ,47	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	1-1
9705,39	3	32,49	33 ,47	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	1-2
9701,12	2	32,49	33 ,47	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	0-1

					
λ, λ	I	E _H , eV	E _B , eV	Transition	J
9358,37 8665,22 8663,65 8652,6 8500,32	1 3 2 1 10	38,65 43,03 43,03 42,83 30,64	39,97 44,46 44,46 44,26 32,10	4s ¹ S-4p ¹ P° 5f ³ F°-6g ³ G 5f ³ F°-6g ³ G 5d ³ D-6p ³ P° 3s ¹ S-3p ¹ P°	0—1 4—5 3—4 3—2 0—1
8358,72 8357,86 8347,94 8341,59 8332,99	2 2 5 6 7	39,84 39,85 39,84 39,84 39,85	41,33 41,33 41,33 41,33 41,33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 3—3 1—2 2—3 3—4
8296,51 8272,26 8255,62 8196,48	1 1 1 10	41,33 41,33 41,33	42,83 42,83 42,83	$3d \ ^3F^{\circ} - 5d \ ^3D$ $3d \ ^3F^{\circ} - 5d \ ^3D$ $3d \ ^3F^{\circ} - 5d \ ^3D$	4-3 3-2 2-1
8021,14 7796,00 7780,42 7707,43 7625,94 7612,65	1 4 3 6 2 7	42,98 40,57 40,57 39,64 38,22 {41,33 38,22	44,52 42,16 42,16 41,25 39,84 42,96 39,85	$5d ^{1}D - 6f ^{1}F^{\circ}$ $3p ^{3}S - 3d ^{3}P^{\circ}$ $3p ^{3}S - 3d ^{3}P^{\circ}$ $3p ^{1}P - 3d ^{1}D^{\circ}$ $3s ^{3}P^{\circ} - 4d ^{3}D$ $3d ^{3}F^{\circ} - 5g ^{3}G$ $3s ^{3}P^{\circ} - 4d ^{3}D$	2—3 1—2 1—1 1—2 2—2 4—5 2—3
7595 ,29 7592 ,28 7586 ,40 7578 ,16 7576 ,68	2 5 4 4 2	38 ,21 41 ,33 38 ,21 41 ,33 38 ,21	39,84 42,96 39,84 42,96 39,84	3s ³ P°—4d ³ D 3d ³ F°—5g ³ G 3s ³ P°—4d ³ D 3d ³ F°—5g ³ G 3s ³ P°—4d ³ D	$ \begin{array}{c} 1-1 \\ 3-4 \\ 1-2 \\ 2-3 \\ 0-1 \end{array} $
7486 ,52 7353 ,96 7212 ,29 7210 ,52 7037 ,25	3 0 1 2 7	\$\begin{cases} 42,83 \\ 42,83 \\ 42,83 \\ 41,30 \\ 42,67 \\ 42,67 \\ 38,43 \end{cases}	44,48 44,48 44,48 42,98 44,39 44,39 40,19	$5d \ ^{3}D - 6f \ ^{3}F$ $3p \ ^{1}D - 3d \ ^{1}P^{\circ}$ $5p \ ^{3}P^{\circ} - 6d \ ^{3}D$ $5p \ ^{3}P^{\circ} - 6d \ ^{3}D$ $3s \ ^{1}P^{\circ} - 4d \ ^{1}D$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 2-3 \\ 2-1 \\ 1-2 \\ 2-3 \\ 1-2 \end{array} $
6899 ,64 6881 ,09 6872 ,05 6868 ,80 6862 ,71	1 1 4 1 3	40,87 40,06 40,06 40,05 40,05	42,67 41,86 41,86 41,86 41,86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 3-2 \\ 3-3 \\ 2-1 \\ 2-2 \end{array} $
6857,27 6853,70 6851,20 6774,93 6773,37	2 1 1 0 1	40,05 40,05 40,05 42,16 38,22	41,86 41,86 41,86 43,99 40,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 1 - 2 \\ 2 - 1 \\ 2 - 1 \end{array} $
6762 ,17 6744 ,38 6742 ,24 6731 ,04 6727 ,39	4 7 5 6 6	38 ,22 38 ,22 38 ,21 38 ,21 38 ,21	40,05 40,06 40,05 40,05 40,05	$3s \ ^{3}P^{\circ} - 3p \ ^{3}D$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}D$	$ \begin{array}{c} 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \\ 0-1 \end{array} $
6460 ,33 6350 ,76 6205 ,56 6163 ,96 6159 ,97	0 2 5 0	42,56 41,30 39,97 39,85 39,84	44,47 43,25 41,97 41,86 41,86	$5p ^{1}P^{\circ} - 6d ^{1}D$ $3p ^{1}D - 5f ^{1}F^{\circ}$ $4p ^{1}P^{\circ} - 5s ^{1}S$ $4d ^{3}D - 3d ^{3}D^{\circ}$ $4d ^{3}D - 3d ^{3}D^{\circ}$	$ \begin{array}{r} 1 - 2 \\ 2 - 3 \\ 1 - 0 \\ 3 - 2 \\ 2 - 1 \end{array} $
6156,68 6155,09 6154,13 6149,23 6147,81	3 2 1 0 0	39,85 39,84 39,84 39,84 39,84	41,86 41,86 41,86 41,86 41,86	$4d\ ^3D - 3d\ ^3D^\circ$ $4d\ ^3D - 3d\ ^3D^\circ$ $4d\ ^3D - 3d\ ^3D^\circ$ $4d\ ^3D - 3d\ ^3D^\circ$ $4d\ ^3D - 3d\ ^3D^\circ$	3-3 $ 2-2 $ $ 1-1 $ $ 1-2 $ $ 2-3$

λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
5894,07	3	40,06	42,16	3p 3D—3d 3P°	3-2
5880,54	1	40,05	42,16	3p 3D—3d 3P°	2-2
5871,69	2	40,05	42,16	3p 3D—3d 3P°	2-1
5863,24	1	40,05	42,16	3p 3D—3d 3P°	1-1
5858,35	1	40,05	42,16	3p 3D—3d 3P°	1-0
5826,42	1	40,49	42,32	$4d ^{1}D - 3d ^{1}F^{\circ}$	2-3
5771,66	2	42,32	44,47	$3d ^{1}F^{\circ} - 6g ^{1}G$	3-4
5695,92	12	32,10	34,28	$3p ^{1}P^{\circ} - 3d ^{1}D$	1-2
5359,95	2	39,85	42,16	$4d ^{3}D - 3d ^{3}P^{\circ}$	3-2
5353,12	0	39,84	42,16	$4d ^{3}D - 3d ^{3}P^{\circ}$	2-2
5345 ,84	$ \begin{array}{c} 1 \\ 0 \\ 0 \\ 2 \\ 6 \end{array} $	39,84	42,16	4d 3D—3d 3P°	2-1
5341 ,46		39,84	42,16	4d 3D—3d 3P°	1-1
5337 ,42		39,84	42,16	4d 3D—3d 3P°	1-0
5305 ,10		43,03	45,37	5f 3F°—7g 3G	-
5272 ,53		38,22	40,57	3s 3P°—3p 3S	2-1
5253,58	5	38 ,21	40 ,57	$3s ^3P^{\circ} - 3p ^3S$	1—1
5249,11	4	40 ,19	42 ,56	$4d ^1D - 5p ^1P^{\circ}$	2—1
5244,67	3	38 ,21	40 ,57	$3s ^3P^{\circ} - 3p ^3S$	0—1
4859,6	0	42 ,83	45 ,38	$5d ^3D - 7f ^3F^{\circ}$	3—4
4793,66	2	40 ,06	42 ,67	$3p ^3D - 5p ^3P^{\circ}$	3—2
4730,16 4724,33 4673,95 4665,86 4663,64	1 6 8 6	40,05 40,05 38,22 38,22 38,21	42,67 42,67 40,87 40,87 40,87	$3p \ ^{3}D - 5p \ ^{3}P^{\circ}$ $3p \ ^{3}D - 5p \ ^{3}P^{\circ}$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}P$	$ \begin{array}{c} 2-1 \\ 1-0 \\ 2-1 \\ 2-2 \\ 1-0 \end{array} $
4659 ,06	5	38 ,21	40,87	$3s \ ^{3}P^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}S - 3p \ ^{3}P^{\circ}$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}S - 3p \ ^{3}P^{\circ}$	1—1
4652 ,06	5	38 ,21	40,87		0—1
4651 ,47	11	29 ,53	32,19		1—0
4651 ,01	5	38 ,21	40,87		1—2
4650 ,25	13	29 ,53	32,19		1—1
4647,42 4593,3 4587,6 4516,77 4515,78	14 1 0 6 5	29 ,53 48 ,31 48 ,31 39 ,39 39 ,39	32,19 51,01 51,01 42,14 42,14	$3s \ ^{3}S - 3p \ ^{3}P^{\circ}$ $4f \ ^{3}D - 5g \ ^{3}F^{\circ}$ $4f \ ^{3}D - 5g \ ^{3}F^{\circ}$ $4p \ ^{3}P^{\circ} - 5s \ ^{3}S$ $4p \ ^{3}P^{\circ} - 5s \ ^{3}S$	$ \begin{array}{r} 1-2 \\ 3-4 \\ - \\ 2-1 \\ 1-1 \end{array} $
4515 ,33 4443 ,08 4388 ,016 4383 ,544 4382 ,898	3 2 4 2 3	39,39 40,19 39,85 39,84 39,84	42 ,14 42 ,98 42 ,67 42 ,67 42 ,67	$4p \ ^3P^{\circ} - 5s \ ^3S \ 4d \ ^1D - 3d \ ^1P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ} \ $	0-1 $2-1$ $3-2$ $2-2$ $2-1$
4379,952	2	39 ,84	42,67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
4379,481	2	39 ,84	42,67		1-0
4367,50	3	48 ,13	50,97		4-5
4361,87	4	48 ,13	50,97		-
4358,90	2	48 ,14	50,96		5-6
4325,560	8	38,43	41,30	$3s {}^{1}P^{\circ} - 3p {}^{1}D$	1-2
4315,44	3	48,06	50,93	$4d {}^{3}D^{\circ} - 5f {}^{3}F$	3-4
4257,894	2	39,92	42,83	$4f {}^{3}F^{\circ} - 5d {}^{3}D$	4-3
4256,455	1	39,92	42,83	$4f {}^{3}F^{\circ} - 5d {}^{3}D$	3-2
4255,42	1	39,91	42,83	$4f {}^{3}F^{\circ} - 5d {}^{3}D$	2-1
4247,308	4	39,64	42,56	$3p ^{1}P - 5p ^{1}P^{\circ}$	1-1
4186,900	9	40,01	42,97	$4f ^{1}F^{\circ} - 5g ^{1}G$	3-4
4173,089	2	40,01	42,98	$4f ^{1}F^{\circ} - 5d ^{1}D$	3-2
4166,95	1	41,30	44,27	$3p ^{1}D - 6p ^{1}P^{\circ}$	2-1
4163,26	2	40,06	43,03	$3p ^{3}D - 5f ^{3}F^{\circ}$	3-3
4162 ,86 4156 ,76 4156 ,49 104	7 2 6	40,06 40,05 40,05	43,03 43,03 43,03	3p 3D—5f 3F° 3p 3D—5f 3F° 3p 3D—5f 3F°	3-4 2-2 2-3

	,				
λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
4152 ,512	5	40 ,05	43 ,03	3p 3D—5f 3F°	$^{1-2}_{1-2}$
4121 ,843	5	39 ,97	42 ,98	4p 1P°—5d 1D	
4070,261 4068,912 4067,940 4056,062 4001,56	9 9 8 7 0	39,92 39,92 39,91 40,19 47,83	42,96 42,96 42,96 43,25 50,93	4f ³ F°—5g ³ G 4f ³ F°—5g ³ G 4f ³ F°—5g ³ G 4d ¹ D—5f ¹ F° 4d ³ F°—5f ³ G	4-5 3-4 2-3 2-3
3999 ,92	0	47,83	50,93	4d ³ F°—5f ³ G	4-5
3889 ,475	1	39,85	43,03	4d ³ D—5f ³ F°	3-3
3889 ,144	6	39,85	43,03	4d ³ D—5f ³ F°	3-4
3885 ,941	5	39,84	43,03	4d ³ D—5f ³ F°	2-3
3883 ,816	4	39,84	43,03	4d ³ D—5f ³ F°	1-2
3703 ,71	4	39 ,64	42,98	$3p^{1}P - 3d^{1}P^{\circ}$	1—1
3609 ,625	6	39 ,39	42,83	$4p^{3}P^{\circ} - 5d^{3}D$	2—2, 3
3609 ,063	5	39 ,39	42,83	$4p^{3}P^{\circ} - 5d^{3}D$	1—1, 2
3608 ,81	3	39 ,39	42,83	$4p^{3}P^{\circ} - 5d^{3}D$	0—1
3262 ,272	3	38 ,36	42,16	$4s^{3}S - 3d^{3}P^{\circ}$	1—2
3259,541	2	38 ,36	42,16	$4s {}^{3}S - 3d {}^{3}P^{\circ}$	1—1
3258,00	1	38 ,36	42,16	$4s {}^{3}S - 3d {}^{3}P^{\circ}$	1—0
3170,016	4	38 ,65	42,56	$4s {}^{1}S - 5p {}^{1}P^{\circ}$	0—1
3161,92	2	38 ,22	42,14	$3s {}^{3}P^{\circ} - 5s {}^{3}S$	2—1
3155,09	1	38 ,21	42,14	$3s {}^{3}P^{\circ} - 5s {}^{3}S$	1—1
3151,85	0	38 ,21	42,14	3s ³ P°-5s ³ S	0-1 $2-1$ $2-1$ $1-2$ $1-1$
3038,91	1	40 ,19	44,27	4d ¹ D-6p ¹ P°	
2982,106	8	34 ,28	38,43	3d ¹ D-3s ¹ P°	
2874,722	3	38 ,36	42,67	4s ³ S-5p ³ P°	
2874,43	2	38 ,36	42,67	4s ³ S-5p ³ P°	
2874 ,24	0	38,36	42,67	$4s\ ^3S - 5p\ ^3P^\circ \ 4d\ ^1D - 6f\ ^1F^\circ \ 4s\ ^1S - 3d\ ^1P^\circ \ 4f\ ^3F^\circ - 6g\ ^3G \ 4f\ ^3F^\circ - 6g\ ^3G$	1-0
2863 ,712	4	40,19	44,52		2-3
2857 ,013	1	38,65	42,98		0-1
2854 ,13	0	48,13	52,47		-
2853 ,13	0	48,13	52,47		4-5
2849 ,050	5	38 ,43	42,78	$3s ^{1}P^{\circ} - 3p ^{1}S$ $2p ^{1}P^{\circ} - 2p^{2} ^{3}P$ $4d ^{3}D - 6p ^{3}P$	1-0
2844 ,117	2	12 ,69	17,04		1-2
2808 ,07	1	39 ,85	44,26		3-2
2806 ,31	1	39 ,84	44,26		2-1
2805 ,13	0	39 ,84	44,26		1-0, 1
2799 ,47	4	40,06	44,48	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4
2796 ,46	3	40,05	44,48		2-3
2794 ,56	2	40,05	44,48		1-2
2777 ,714	5	40,01	44,47		3-4
2751 ,828	3	39,97	44,47		1-2
2725,90	7	39 ,92	44,46	4f ³ F°—6g ³ G	4-5
2725,30	7	39 ,92	44,46	4f ³ F°—6g ³ G	3-4
2724,85	6	39 ,91	44,46	4f ³ F°—6g ³ G	2-3
2697,75	7	39 ,39	43,99	4p ³ P°—6s ³ S	2-1
2697,42	3	39 ,39	43,99	4p ³ P°—6s ³ S	1-1
2672,959	5	39 ,85	44,48	4d ³ D-6f ³ F°	$ \begin{array}{r} 3-4 \\ 2-3 \\ 1-2 \\ 1-0 \\ 1, 2-1 \end{array} $
2671,318	4	39 ,84	44,48	4d ³ D-6f ³ F°	
2670,240	3	39 ,84	44,48	4d ³ D-6f ³ F°	
2616,627	4	33 ,47	38,21	3d ³ D-3s ³ P°	
2614,478	5	33 ,47	38,21	3d ³ D-3s ³ P°	
2610,020	6	33,47	38,22	$3d\ ^{3}D - 3s\ ^{3}P^{\circ}$	3-2 $ 2-2 $ $ 2-3 $ $ 1, 0-2, 1 $ $ 1-2$
2609,83	1	33,47	38,22	$3d\ ^{3}D - 3s\ ^{3}P^{\circ}$	
2480,861	4	39,39	44,39	$4p\ ^{3}P^{\circ} - 6d\ ^{3}D$	
2480,502	4	39,39	44,39	$4p\ ^{3}P^{\circ} - 6d\ ^{3}D$	
2296,870	16	12,69	18,09	$2p\ ^{1}P^{\circ} - 2p^{2}\ ^{1}D$	

λ, ἐ	I	E _H , eV	E _B , eV	Transition	J
2202 ,54 2176 ,963 2162 ,944 2145 ,58 2142 ,49	1 4 9 0 1	38,65 34,28 34,28 40,87 40,87	44,27 39,97 40,01 46,69 46,69	$4s {}^{1}S - 6p {}^{1}P^{\circ}$ $3d {}^{1}D - 4p {}^{1}P^{\circ}$ $3d {}^{1}D - 4f {}^{1}F^{\circ}$ $3p {}^{3}P - 4s {}^{3}P^{\circ}$ $3p {}^{3}P - 4s {}^{3}P^{\circ}$	0-1 $2-1$ $2-3$ $2, 1-1, 0$ $2-2$
2140,92 2139,86 2100,46 2091,999 2016,84	1 1 0 6	41,86 41,86 38,36 { 33,47 33,47 42,16	47,65 47,65 44,26 39,39 39,39 39,39 48,31	3d ³ D°-4p ³ P 3d ³ D°-4p ³ P 4s ³ S-6p ³ P° 3d ³ D-4p ³ P° 3d ³ D-4p ³ P° 3d ³ D-4p ³ P° 3d ³ P°-4f ³ D	1, 2-0, 1 3-2 1-2 1-0, 1 2-1, 2 3-2 2-3
2015,7 2010,094 2009,570 2009,327 1979,62	0 5 4 2 1	42,16 32,19 32,19 32,19 41,86	48,31 38,36 38,36 38,36 48,13	$3d\ ^{3}P^{\circ}-4f\ ^{3}D$ $3p\ ^{3}P^{\circ}-4s\ ^{3}S$ $3p\ ^{3}P^{\circ}-4s\ ^{3}S$ $3p\ ^{3}P^{\circ}-4s\ ^{3}S$ $3d\ ^{3}D^{\circ}-4f\ ^{3}F$	- 2-1 1-1 0-1
1979 , 16 1931 ,027 1923 ,31 1923 ,14	2 4 2 4	41,86 - { 33,47 33,47 33,47	48 ,13 — 39 ,91 39 ,92 39 ,92	$3d\ ^3D^{\circ}$ —4f 3F — $3d\ ^3D$ —4f $^3F^{\circ}$ $3d\ ^3D$ —4f $^3F^{\circ}$ $3d\ ^3D$ —4f $^3F^{\circ}$	3-4 - 1, 2-2 3-3 2-3
1922,93 1894,49 1645,06 1620,68 1620,33 1620,05	5 2 1 1 2 3	33,47 — — — — —	39,92 — — — — —	3d 3D—4f 3F° — — — — — — — —	3—4 — — — — —
1591 ,48 1577 ,89 1577 ,32 1576 ,49 1531 ,85	2 2 2 3 2	_ _ _ _	_ _ _ _		
1478 ,30 1478 ,05 1477 ,68 1428 ,95 1428 ,53	1 2 3 1 2	_ _ _ _	_ 	 	_ _ _ _
1428 ,17 1427 ,85 1426 ,78 1426 ,45 1308 ,73	2 3 1 4 2	- - - -	_ _ _ _	_ _ _ _	
1296,30 1256,52 1247,383 1176,370 1175,987	2 1 3 3 3	_ 12,69 6,49 6,49	22,63 17,03 17,03	$\begin{array}{c} - \\ - \\ 2p \ ^1P^{\circ} - 2p^2 \ ^1S \\ 2p \ ^3P^{\circ} - 2p^2 \ ^3P \\ 2p \ ^3P^{\circ} - 2p^2 \ ^3P \end{array}$	
1175,711 1175,590 1175,263 1174,933 1165,87	5 2 3 3 1	6,49 6,49 6,49 6,49	17,04 17,03 17,03 17,04	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 1—1 0—1 1—2
977,026 884,516 784,393 714,879 690,526	18 8 3 1 7	0,00 — — — 12,69	12,69 — — 30,64	$2s^{2} {}^{1}S - 2p {}^{1}P^{\circ}$ $ 2p {}^{1}P^{\circ} - 3s {}^{1}S$	0—1 — — — 1—0

λ, Å	I	E _H , eV	E _B , eV	Transition	J
622,144	2	_	_	_	_
$609,275 \\ 609,025$	$egin{array}{c} 6 \ 4 \end{array}$	_		-	<u> </u>
585,666	6_6	_	_	_	_
585,608 585,496	5	_			_
585 , 417	8	_	_	_	_
585 ,261 574 ,279	$\frac{6}{12}$	12,69	34 , 28	$2p {}^{1}P^{\circ} - 3d {}^{1}D$	
566,490	4		-	_	_
565 ,530 554 ,655	$\begin{array}{c} 7 \\ 2 \end{array}$	18 ,09	40,01	$2p^{2} {}^{1}D - 4f {}^{1}F^{\circ}$	2—3
538 ,312	13	6,49	29,53	$2p ^3P^{\circ} - 3s ^3S$	2—1
538 ,150 538 ,0 7 5	12 11	6 ,49 6 ,49	29 ,53 29 ,53	$2p \ ^{3}P^{\circ} - 3s \ ^{3}S \ 2p \ ^{3}P^{\circ} - 3s \ ^{3}S$	1—1 0—1
535,288	10	18,09	41,25	$2p^2 {}^{1}D - 3d {}^{1}D^{\circ}$	2—2
511,52 7	10	18,09	42 ,32	$2p^{2} {}^{1}D - 3d {}^{1}F^{\circ}$	2—3
583, 499 530, 499	7 9	_	_	-	_
499 ,462	8	_	_	_	_
499, 425 497, 910	7 1	_	_	_ _	_
587, 493	7	_	-	_	_
493 ,519 493 ,464	5 5	_	_	_	_
493 ,396	5	_		_	_
493, 364 493, 341	5 5	_	_	-	<u> </u>
649, 492	7	18,09	43,25	$2p^2 {}^1\!D - 5f {}^1\!F^{\circ}$	2 <u>—</u> 3
483 ,733	5 4	_	_	<u> </u>	_
483 ,618 483 ,567	3			— -	
477 ,625 460 ,050	3 8	12 ,69 12 ,69	38,65 39,64	$2p {}^{1}P^{\circ} - 4s {}^{1}S \\ 2p {}^{1}P^{\circ} - 3p {}^{1}P$	1—0 1—1
459,633	15	6,49	33,47	$2p ^{3}P^{\circ} - 3d ^{3}D$	2—1
459,521	14 13	6 ,49 6 ,49	33 ,47 33 ,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 0—1
459 ,462 450 ,732	9	12 ,69	40,19	$2p {}^{1}P^{\circ} - 4d {}^{1}D$	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
433 ,337 418 ,609	$\frac{8}{2}$	12 ,69 —	41 <u>,</u> 30 —	$2p {}^{1}P^{\circ} - 3p {}^{1}D$	1—2 —
416,769	5	_	_		
958, 411	3 6	12 ,6 9	42 , 7 8	$2p {}^{1}P^{\circ} - 3p {}^{1}S$	1 <u>-</u> 0 -
325, 409 399, 688	6		_	_	_
399,637	6	_		_	_
398 ,551 398 ,168	1 1	-	_	— —	
390 ,055 389 ,090	3 7			$2p {}^{3}P^{\circ} - 4s {}^{3}S$	 2 <u></u> 1
389,090	6	6,49	38,36	$2p^{3}P^{\circ}-4s^{3}S$	1—1
388,965	5	6,49	38,36	$2p ^3P^{\circ} - 4s ^3S$	0—1 0—1
386 ,203 379 ,065	14 1	0,00	32 ,1 0	$2s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$	-
3 7 1,784	8	6,49	39,84 39,84	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-2 \\ 2-3 \end{array}$
371,747	10	6,49	39,84	$2p ^{3}P - 4d ^{3}D$ $2p ^{3}P - 4d ^{3}D$	1—2
371,694	10	$\left\{ egin{array}{l} 6,\!49 \ 6,\!49 \end{array} ight.$	39 ,84 39 ,84	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0—1
369,472	2 5	<u>-</u>	_	- -	<u>-</u>
369 ,415	J		_		107

λ, Å	I	$\stackrel{\prime}{E}_{ m H},\;\;{ m eV}$	$E_{_{ m B}},$ eV	Transition	J
366 ,169 365 ,778	4 1		_		<u>-</u> -
363,864 363,790 363,761 360,675 360,623	6 5 4 5 7	6,49 6,49 6,49 — —	40 ,57 40 ,57 40 ,57 —	2p 3P°—3p 3S 2p 3P°—3p 3S 2p 3P°—3p 3S ————————————————————————————————————	2—1 1—1 0—1 —
360 ,557 358 ,740 353 ,000 350 ,330 347 ,854	6 4 3 2 3	_ _ _ _	_ _ _ _	_ _ _ _ _	_ _ _ _ _
347 ,777 341 ,242 341 ,179 341 ,143 339 ,773	3 7 6 5 1	_ _ _ _	_ _ _ _	_ _ _ _ _	— — — — —
330 ,687 330 ,637 327 ,784 327 ,176 327 ,112	1 1 1 4 4	_ _ _ _	_ _ _ _	_ _ _ _ _	
325,570 322,575 319,266 314,395 310,171	1 8 3 1 7	0,00 _ 0,00	38,43 - - 39,97	$2s^{2} {}^{1}S - 3s {}^{1}P^{\circ}$ $ 2s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$	0—1 — — 0—1
303 ,468 303 ,432 301 ,279 301 ,243 301 ,206	1 4 1 3 2	 	_ _ _ _	_ _ _ _ _	_ _ _ _ _
291,330 281,390 280,522 280,043 274,051	5 2 2 3 2	0,00 	42,56 — — — —	2s ² ¹ S—5p ¹ P° — — — — — — —	0—1 — — — —
271,014 270,583	1 1	_		_	_ _

G IV, ground state $1s^2 2s {}^2S_{1/2}$ Ionization potential 520177,8 cm⁻¹; 64,490 eV

λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
7726 ,2	6	58 ,44	60,05	$6f {}^2F^{\circ}$ — $7g {}^2G$ etc.	_
5811 ,98	9	37 ,55	39,68	$3s {}^2S - 3p {}^2P^{\circ}$	$^{1}/_{2}$ — $^{1}/_{2}$
5801,33	10	37,55	39,68	$3s {}^{2}S - 3p {}^{2}P^{\circ}$	$^{1}/_{2}$ _3 $^{-}$ 3 $^{-}$ 2
5018,39	2	55,65	58 ,12	$5p\ ^{2}P^{\circ}$ — $6s\ ^{2}S$	$3/2_{2}^{2}_{2}^{-1}/2_{2}^{2}$
5016,58	1	55,65	58 ,12	$5p^{2}P^{\circ}-6s^{2}S$	$1/2_{2}^{1/2}$
4786,7	0	55,78	58,36	$5d^{-2}D - 6p^{-2}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$
4785,88	1	55,78	58,36	$5d^{2}D-6p^{2}P^{\circ}$	5/2 - 3/2
4685,4	1	58,44	61,09	$6f^{2}F^{\circ}-8g^{2}G$ etc.	, z , z , z ,
4658,30	$ar{9}$	55,78	58,44	$5f^2F^\circ-6g^2G$ etc.	
4646	coincident with C III	'-0	58,44	$5d^{2}D-6f^{2}F^{\circ}$	$^{5}/_{2}$ — $^{5}/_{2}$, $^{7}/_{2}$

	<u> </u>			<u> </u>	
λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
4441 ,49 4440 ,34 3934 ,89 3934 ,29 3689 ,6	3 2 1 2 2	55,65 55,65 55,22 55,22 58,44	58,44 58,44 58,36 58,36 61,80	$5p \ ^{2}P^{\circ}-6d \ ^{2}D$ $5p \ ^{2}P^{\circ}-6g \ ^{2}D$ $5s \ ^{2}S-6p \ ^{2}P^{\circ}$ $5s \ ^{2}S-6p \ ^{2}P^{\circ}$ $6f \ ^{2}F^{\circ}-9g \ ^{2}G \ $ etc.	3/2 - 5/2 $1/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$
2953 ,95 2953 ,40 2935 ,12 2906 ,29 2901 ,60	1 0 1 5 2	55,65 55,65 55,78 55,77 55,78	59,84 59,84 60,00 60,05 60,05	$5p ^{2}P^{\circ} - 7s ^{2}S$ $5p ^{2}P^{\circ} - 7s ^{2}S$ $5d ^{2}D - 7p ^{2}P^{\circ}$ $5f ^{2}F^{\circ} - 7g ^{2}G$ etc. $5d ^{2}D - 7g ^{2}G$	$\begin{array}{c} 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 5/_2, 3/_2 - 3/_2, 1/_2 \\ - \\ 5/_2 - 7/_2 \end{array}$
2819 ,24 2698 ,67 2697 ,75 2595 ,295 2595 ,089	1 4 4 3 4	55,65 50,62 50,62 50,87 50,87	60,04 55,22 55,22 55,65 55,65	5p ² P°—7d ² D 4p ² P°—5s ² S 4p ² P°—5s ² S 4d ² D—5p ² P° 4d ² D—5p ² P°	3/2, $1/2 - 5/2$, $3/23/2 - 1/21/2 - 1/23/2 - 1/23/2 - 1/25/2 - 3/2$
2533 ,77 2530 ,6 2529 ,98 2527 ,7 2524 ,41	2 6 11 1 9	50,88 50,88 50,88 50,87 50,87	55 ,78 55 ,78 55 ,78 55 ,78 55 ,78	$4f ^2F^{\circ}$ — $5d ^2D$ $4f ^2F^{\circ}$ — $5f ^2F^{\circ}$ $4f ^2F^{\circ}$ — $5g ^2G$ $4d ^2D$ — $5d ^2D$ $4d ^2D$ — $5f ^2F^{\circ}$	$\begin{array}{c} 7_2', 5_2' - 5_2, 3_2 \\ 7_2 - 5_2, 7_2 \\ 7_2 - 7_2, 9_2 \\ 5_2, 3_2 - 5_2, 3_2 \\ 5_2, 3_2 - 5_2 \end{array}$
2523,7 2405,10 2404,44 2335,90 2104,24	4 6 5 2 1	50 ,87 50 ,62 50 ,62 55 ,77 49 ,76	55 ,78 55 ,78 55 ,78 61 ,09 55 ,65	$4d\ ^{2}D-5g\ ^{2}G$ $4p\ ^{2}P^{\circ}-5d\ ^{2}D$ $4p\ ^{2}P^{\circ}-5d\ ^{2}D$ $5f\ ^{2}F^{\circ}-8g\ ^{2}G$ etc. $4s\ ^{2}S-5p\ ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ - \\ 1/2 - 1/2 \end{array} $
2103,94 1550,771 1548,185 1230,511	2 19 20 3	49,76 0,00 0,00 39,68	55,65 7,99 8,01 49,76	$4s^2S - 5p^2P^{\circ} \ 2s^2S - 2p^2P^{\circ} \ 2s^2S - 2p^2P^{\circ} \ 3p^2P^{\circ} - 4s^2S$	$^{1/_{2}-^{3}/_{2}}$ $^{1/_{2}-^{1}/_{2}}$ $^{1/_{2}-^{3}/_{2}}$ $^{3/_{2}-^{1}/_{2}}$
1230,046 1198,58 1168,990 1168,873 1107,933	$\begin{array}{c} 2 \\ 1 \\ 4 \\ 3 \\ 2 \end{array}$	39,68 	49,76 50,88 50,88 50,87	$3p \ ^{2}P^{\circ}-4s \ ^{2}S$ - $3d \ ^{2}D-4f \ ^{2}F^{\circ}$ $3d \ ^{2}D-4f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}-4d \ ^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1107,600 948,214 948,098 770,379 419,714	1 1 2 0 14	39,68 37,55 37,55 — 8,01	50,87 50,62 50,62 — 37,55	$3p \ ^{2}P^{\circ}-4d \ ^{2}D \ 3s \ ^{2}S-4p \ ^{2}P^{\circ} \ 3s \ ^{2}S-4p \ ^{2}P^{\circ} \ -2p \ ^{2}P^{\circ}-3s \ ^{2}S$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 1/_2 - 3/_2 \\ - \\ 3/_2 - 1/_2 \end{array} $
419,525 384,178 384,032 312,455 312,418 307,806	13 17 16 14 15	7,99 8,01 7,99 0,00 0,00 0,00	37,55 40,28 40,28 39,68 39,68 40,28	$\begin{array}{c} 2p \ ^{2}P^{\circ}-3s \ ^{2}S \\ 2p \ ^{2}P^{\circ}-3d \ ^{2}D \\ 2p \ ^{2}P^{\circ}-3d \ ^{2}D \\ 2s \ ^{2}S-3p \ ^{2}P^{\circ} \\ 2s \ ^{2}S-3p \ ^{2}P^{\circ} \\ 2s \ ^{2}S-3d \ ^{2}D \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
296,951 296,857 289,143 289,048 262,627	7 6 9 3 4	7,99 8,01 7,99 8,01 7,99	49,76 49,76 50,87 50,87 55,22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2} - \frac{1}{2}$ $\frac{1}{2} - \frac{1}{2}$ $\frac{3}{2} - \frac{3}{2}$, $\frac{5}{2}$ $\frac{1}{2} - \frac{3}{2}$
262,553 259,542 259,471 247,415 247,357	3 7 6 2 1	8,01 7,99 8,01 7,99 8,01	55,22 55,78 55,78 55,22 55,22	$2p^{2}P^{\circ}_{-}5s^{2}S$ $2p^{2}P^{\circ}_{-}5d^{2}D$ $2p^{2}P^{\circ}_{-}5d^{2}D$ $2p^{2}P^{\circ}_{-}6s^{2}S$ $2p^{2}P^{\circ}_{-}6s^{2}S$	$ \begin{array}{c} \frac{1}{2} - \frac{1}{2} \\ \frac{3}{2} - \frac{3}{2} \\ \frac{1}{2} - \frac{5}{2} \\ \frac{3}{2} - \frac{1}{2} \\ \frac{1}{2} - \frac{1}{2} \end{array} $
245 ,830 245 ,775 244 ,907	5 4 10	7,99 8,01 0,00	58 ,44 58 ,44 50 ,62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \frac{3}{2} - \frac{3}{2}, \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2}, \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2}, \frac{1}{2} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
239 ,196 238 ,250	1 3	8,01 7,99	59,84 60,04	$2p^{2}P^{\circ}7s^{2}S$ $2p^{2}P^{\circ}7d^{2}D$	$\frac{3}{2}$, $\frac{1}{2} - \frac{1}{2}$ $\frac{3}{2} - \frac{5}{2}$, $\frac{3}{2}$
238 ,200 233 ,530 230 ,43 228 ,27 222 ,791	2 3 2 1 7	8,01 8,01 8,01 8,01 0,00	60,04 61,09 61,80 61,31 55,65	$2p^{2}P^{\circ}-7d^{2}D$ $2p^{2}P^{\circ}-8d^{2}D$ $2p^{2}P^{\circ}-9d^{2}D$ $2p^{2}P^{\circ}-10d^{2}D$ $2s^{2}S-5p^{2}P^{\circ}$	$\begin{array}{c} \frac{1}{1/2} - \frac{3}{2} \\ \frac{3}{2}, \frac{1}{2} - \frac{5}{2}, \frac{3}{2} \\ \frac{3}{2}, \frac{1}{2} - \frac{5}{2}, \frac{3}{2} \\ \frac{3}{2}, \frac{1}{2} - \frac{5}{2}, \frac{5}{2} \\ \frac{1}{2} - \frac{3}{2}, \frac{1}{2} \end{array}$
212,421 206,641 203,057 200,68 199,04 197,82	5 3 2 1 1 1	0,00 0,00 0,00 0,00 0,00	58,36 60,00 61,06 61,78 62,29 62,95	2s ² S-6p ² P° 2s ² S-7p ² P° 2s ² S-8p ² P° 2s ² S-9p ² P° 2s ² S-10p ² P° 2s ² S-11p ² P°	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

C V, ground state $1s^{2} {}^{1}S_{0}$ Ionization potential $3162450~{\rm cm^{-1}};~392,067~{\rm eV}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2277 ,92	2	298 ,94	304 ,38	$\begin{array}{c} 2s\ ^3S - 2p\ ^3P^{\circ} \\ 2s\ ^3S - 2p\ ^3P^{\circ} \\ 2s\ ^3S - 2p\ ^3P^{\circ} \\ 2p\ ^3P^{\circ} - 3d\ ^3D \\ 2p\ ^3P^{\circ} - 3d\ ^3D \end{array}$	1—1
2277 ,25	1	298 ,94	304 ,38		1—0
2270 ,91	3	298 ,94	304 ,91		1—2
248 ,744	0	304 ,40	354 ,24		2—1, 2, 3
248 ,668	0	304 ,38	354 ,24		1—1, 2, 3
40,731 40,270 34,973 33,426 32,754	— — —	0,00 0,00 00,00 00,00 00,0	304,38 307,87 354,49 370,90 378,51	$1s^{2} {}^{1}S - 2p {}^{3}P^{\circ}$ $1s^{2} {}^{1}S - 2p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 5p {}^{1}P^{\circ}$	0-1 0-1 0-1 0-1 0-1
32 ,400	_	00, 0	382 ,65	$1s^{2} {}^{1}S - 6p {}^{1}P^{\circ}$	0—1
32 ,188	_	00, 0	385 ,17	$1s^{2} {}^{1}S - 7p {}^{1}P^{\circ}$	0—1
32 ,064	_	00, 0	386 ,66	$1s^{2} {}^{1}S - 8p {}^{1}P^{\circ}$	0—1

C VI, ground state $1s^2S_{1/2}$ Ionization potential 3951950 cm⁻¹; 489,946 eV

λ, Â	I	$E_{\rm H}$, eV $E_{\rm B}$, eV	Transition	J
33 ,734	_	0,00 367,44	1s ² S-2p ² P°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
28 ,464	_	0,00 435,51	1s ² S-3p ² P°	
26 ,988	_	0,00 459,33	1s ² S-4p ² P°	

NITROGEN, Z = 7

N I, ground state $1s^2 2s^2 2p^{3.4}S_{3/2}^0$ Ionization potential 117345 cm⁻¹; 14,548 eV

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λ, Λ	I	E _H , e∨	E_{B} . eV	Transition	J
18751,01	2	13,02	13,68	$3d^4D - 4fD(3)^\circ$	$\frac{7}{2} - \frac{7}{2}, \frac{5}{2}$
18670,00	4	13,02	13,68	$3d^4D - 4fD(3)^{\circ}$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
18658,16	32	13,04	13,70	$3d^2D - 4fF(4)^{\circ}$	$\frac{5}{2} - \frac{7}{2}$
18630,19	13	13,03	13,70	$3d^2D - 4fF(2)^{\circ}$	$\frac{3}{2} - \frac{5}{2}, \frac{3}{2}$
18587,24	13	13,03	13,70	$3d^2D - 4fF(3)^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
18566,75	4	13,02	13,69	$3d^4D - 4fG(4)^\circ$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$
18251,58	11	13,02	13,70	$3d^4D - 4fF(2)^{\circ}$	$\frac{5}{2} - \frac{5}{2}, \frac{3}{2}$
18240,54	13	13,02	13,70	$3d^4D - 4f F(3)^\circ$	$\frac{7}{2} - \frac{7}{2}, \frac{5}{2}$
18229,66	60	13,02	13,70	$3d^4D - 4fF(4)^{\circ}$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$
10229,00	00	13,02	13,70	$\int 3d^4D - 4fF(3)^{\circ}$	$\frac{7}{5} \frac{7}{2} - \frac{7}{2} \frac{5}{2}$
18210,56	32	13,02	13,70	$\int 3d^4D - 4f F(2)^\circ$	$\frac{3}{2} - \frac{5}{2}, \frac{3}{2}$
18199,13	8	13,02	13,70	$3d^4D - 4fF(4)^{\circ}$	$\frac{5}{2} - \frac{7}{2}$
18171,60	13	13,01	13,70	$3d_{A}^{4}D - 4fF(2)_{O}^{O}$	$\frac{1}{2} - \frac{3}{2}$
18169 , 74	13	13,02	13,70	$3d^{4}D - 4fF(3)^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
18116,27	6	13,00	13,69	$3d^4P - 4fD(2)^\circ$	$\frac{1}{2} - \frac{3}{2}$
18108,61	12	13,00	13,69	$3d^2F - 4fG(4)^{\circ}$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$
18097,71	10	13,00	13,68	$3d^4P - 4fD(3)^{\circ}$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
18049,56	33	12,99	13,68	$3d^2F - 4fD(3)^{\circ}$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
18029,95	80	13,00	13,69	$3d^4P - 4fD(2)^{\circ}$	$\frac{3}{2} - \frac{5}{2}, \frac{3}{2}$
17979,89	51	13,00	13,69	$3d^4P - 4fG(3)^0$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
17936,55	17	13,00	13,69	$3d^4P - 4fD(1)^{\circ}$	1/2 -
17925,70	8	13,00	13,69	$3d_{A}^{4}P - 4fG(4)_{O}^{O}$	$\frac{5}{2} - \frac{7}{2}$
17918,06	7	13,00	13,69	$3d^4P - 4fD(2)^{\circ}$	$\frac{5}{2} - \frac{5}{2}, \frac{3}{2}$
17070 06	0	$\int 13,00$	13,70	$3d^2F - 4fG(5)^\circ$	$\frac{7}{2} - \frac{9}{2}$
17878,26	0	(12 , 99	13,69	$3d^2F - 4fG(4)^\circ$	$\frac{5}{2} - \frac{7}{2}$
17852,09	10	13,00	13,69	$3d^4P - 4fD(1)^\circ$	$\frac{3}{2}$ - $\frac{3}{2}$
17787,27	8	13,00	13,70	$3d^2F - 4fF(4)^\circ$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$
17643,98	42	12,98	13,68	$3d^4F - 4fD(3)^\circ$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
17636,83	8	12,98	13,69	$3d^4F - 4fG(3)^\circ$	$\frac{7}{2} - \frac{7}{2}, \frac{5}{2}$
17584,86	100	$\begin{cases} 12,98 \\ 12,98 \end{cases}$	13,69 13,68	$3d^4F - 4fG(4)^\circ$ $3d^4F - 4fD(3)^\circ$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$ $\frac{3}{2} - \frac{5}{2}$
17531,99	18	12,98	13,69	$3d^4F - 4fG(3)^\circ$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
17516,58	125	12,99	13,70	$3d^4F - 4fG(5)^{\circ}$	$\frac{9}{2} - \frac{11}{2}, \frac{9}{2}$
17480.41	27	12,98	13,69	$3d^4F - 4fG(4)^\circ$	$\frac{5}{2} - \frac{7}{2}$
17474,16	32	12,98	13,69	$3d^4F - 4fG(3)^\circ$	$\frac{3}{2} - \frac{5}{2}$
17436,22	24	12,97	13,68	$3d^{2}P - 4fD(3)^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
17429,23	16	12,99	13,70	$3d^4F - 4f F(4)^\circ$	$9/_{2} - 9/_{2}, 7/_{2}$
17385,13	12	12,97	13,69	$3d^{2}P - 4fD(2)^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
17367,55	23	12,98	13,70	$3d^4F - 4fG(5)^\circ$	$\frac{7}{2} - \frac{9}{2}$
17326,86	16	12,97	13,69	$3d^{2}P - 4fG(3)^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
17291,81	6	12,98	13,70	$3d^4F - 4fF(3)^\circ$	$\frac{7}{2} - \frac{7}{2}, \frac{5}{2}$
17282,04	4	12,98	13,70	$3d^{4}F - 4fF(4)^{\circ}$	$\frac{7}{2} - \frac{9}{2}, \frac{7}{2}$
17269,17	11	12,97	13,69	$3d^2P - 4fD(2)^{\circ}$	$\frac{3}{2} - \frac{5}{2}, \frac{3}{2}$
17219,55	10	12,97	13,69	$3d^{2}P - 4fD(1)^{\circ}$	1/2 -
15771,10	22	12,12	12,91	$3p^{2}P^{\circ} - 4s^{2}P$	$\frac{3}{2} - \frac{1}{2}$
15682,86	54	12,12	12,91	$3p^2P^0 - 4s^2P$	$\frac{1}{2} - \frac{1}{2}$
15582,27	200	12,12	12,92	$3p^{2}P^{\circ} - 4s^{2}P$	$\frac{3}{2} - \frac{3}{2}$
15496,13	34	12,12	12,92	$3p^{2}P^{\circ} - 4s^{2}P$	$\frac{1}{2} - \frac{3}{2}$
15146,66	75	10,93	11,75	$2p^{44}P - 3p^{4}D^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
15102,29	26	10,93	11,75	$2p^{44}P - 3p^{4}D^{\circ}$	$\frac{3}{2} - \frac{1}{2}$
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λ, Λ	I	E _H , eV	E _B , eV	Transition	J
15094,96	75	10,93	11,75	$2p^{44}P - 3p^{4}D^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
15050,88	80	10,93	11,75	$2p^{4}P - 3p^{4}D^{\circ}$	$\frac{3}{2} - \frac{3}{2}$
14966,60	180	10,93	11,76	$2p^{44}P - 3p^{4}D^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
14952,07	15	10,92	11,75	$2p^{4} {}^{4}P - 3p {}^{4}D^{\circ}$	$\frac{5}{2} - \frac{3}{2}$
14868,87	100	10,92	11,76	$2p^{44}P - 3p^4D^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
14757.07	300	10,92	11,76	$2p^{44}P - 3p^4D^{\circ}$	$\frac{5}{2} - \frac{7}{2}$
14681,04	55	12,12	12,97	$3p^{2}P^{0} - 3d^{2}P$	$\frac{3}{2} - \frac{3}{2}$
14 604,64	27	12,12	12,97	$3p^{2}P^{\circ} - 3d^{2}P$	$\frac{1}{2} - \frac{3}{2}$
14598,42	17	12,12	12,97	$3p^{2}P^{\circ} - 3d^{2}P$	$\frac{3}{2} - \frac{1}{2}$
14548,55	20	11,99	12,85	$3p^{4}S^{0} - 4s^{4}P$	$\frac{3}{2} - \frac{1}{2}$
14522,81	36	12,12	12,97	$3p^2P^0-3d^2P$	$\frac{1}{2} - \frac{1}{2}$
14454,62	29	11,99	12,85	$3p^{4}S^{\circ} - 4s^{4}P$	$\frac{3}{2} - \frac{3}{2}$
14313,21	80	11,99	12,86	$3p^{4}S^{\circ} - 4s^{4}P$	$\frac{3}{2} - \frac{5}{2}$
13686,03	14	10,93	11,84	$2p^{44}P - 3p^4P^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
13668,60	65	12,12	13,03	$3p^2P^0-3d^2D$	$\frac{3}{2} - \frac{3}{2}$
13651,63	60	10,93	11,84	$2p^{44}P - 3p^{4}P^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
13649,74	58	10,93	11,84	$2p^{44}P - 3p^{4}P^{\circ}$	$\frac{3}{2} - \frac{1}{2}$
13624,18	350	12,12	13,04	$3p^2P^{\circ} - 3d^2D$	$\frac{3}{2} - \frac{5}{2}$
13615,56	35	10,93	11,84	$2p_{2-9}^{4} P - 3p_{2}^{4} P^{\circ}$	$\frac{3}{2} - \frac{3}{2}$
13602,27	190	12,12	13,03	$3p^{2}P^{\circ} - 3d^{2}D$	$\frac{1}{2} - \frac{3}{2}$
13588,55	115	12,00	12,91	$3p^{2}D^{\circ} - 4s^{2}P$	$\frac{3}{2} - \frac{1}{2}$
13587,73	200	12,01	12,92	$3p^{2}D^{\circ} - 4s^{2}P$	$\frac{5}{2} - \frac{3}{2}$
13581,33	1200 65	10,69 10,93	11,60 11,84	$3s^{2}P - 3p^{2}S^{\circ}$ $2p^{4}P - 3p^{4}P^{\circ}$	$\frac{3}{2} - \frac{1}{2}$
13544,61 13534,64	60	10,93	11,84	$2p^{4} P - 3p^{4} P^{\circ}$ $2p^{4} P - 3p^{4} P^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
13464,53	185	10,92	11,84	$2p^{4} P - 3p^{4} P$ $2p^{4} P - 3p^{4} P^{\circ}$	$\frac{5}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{5}{2}$
13448,12	21	12,00	12,92	$3p^{2}D^{\circ} - 4s^{2}P$	$\frac{3}{2} - \frac{3}{2}$
13429,61	670	10,68	11,60	$3s^{2}P - 3p^{2}S^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
12897,32	51	12,01	12,97	$3p^{2}D^{\circ} - 3d^{2}P$	$\frac{72}{5/2} - \frac{3}{2}$
12778,5	5	13,04	14,00	$3d^2D - 5f F(4)^\circ$	$\frac{7}{2} - \frac{7}{2}$
12771,51	15	12,00	12,97	$3p^2D^{\circ} - 3d^2P$	$\frac{3}{2} - \frac{3}{2}$
12730,68	35	12,01	12,98	$3p^{2}D^{\circ} - 3d^{4}P$	$\frac{5}{2} - \frac{7}{2}$
12708,89	30	12,00	12,97	$3p^2D^{\circ} - 3d^2P$	$\frac{3}{2} - \frac{1}{2}$
12662,16	27	12,00	12,98	$3p^2D^{\circ} - 3d^4F$	$\frac{3}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{5}{2}$
12581,00	27	12,01	12,99	$3p^2D^{\circ} - 3d^2F$	$\frac{5}{2} - \frac{5}{2}$
12578,8 12575,99	3	13,02	14,00	$3d^4D - 5fF(3)^{\circ}$	$\frac{7}{2} - \frac{7}{2}$
12564,4	8	13,02	14,00	$3d^4D - 5f F(4)^\circ$	$\frac{7}{2} - \frac{9}{2}$
-	4	13,02	14,00	$3d^4D - 5f F(3)^\circ$	$\frac{5}{2} - \frac{7}{2}$
12557,66	14	$\begin{cases} 12,01 \\ 12,02 \end{cases}$	13,00	$3p^{2}D^{\circ} - 3d^{4}P$	$\frac{5}{2} - \frac{5}{2}$
		(13,02	14,00	$3d^4D - 5fF(2)^\circ$	³ / ₂ -
12469,62	1350	$\begin{cases} 12,99 \\ 12,01 \end{cases}$	14,00	$3d^2F - 5fD(3)^\circ$	⁵ / ₂ —
12464-2	_	12,01	13,00	$3p^{2}D^{\circ} - 3d^{2}F$	$\frac{5}{2} - \frac{7}{2}$
12464,2 12461,25	5 680	13,00 12,00	14,00	$3d^4P - 5fD(2)^{\circ}$ $3p^2D^{\circ} - 3d^2F$	$\frac{3}{2} - \frac{5}{2}$
12438,40	680 195	12,00	12,99 13,00	$3p^{2}D^{2} - 3d^{2}F$ $3p^{2}D^{2} - 3d^{4}P$	$\frac{3}{2} - \frac{5}{2}$
12428,81	6	13,00	13,00	3p D = 3a P $3d^4P = 5f G(3)^\circ$	$\frac{3}{2} - \frac{5}{2}$
12404,27	98	11,99	12,99	$3p^4S^0 - 3d^2F$	$\frac{5}{2} - \frac{7}{2}$
12391,9	5	12,99		$3d^2F - 5fG(4)^\circ$	$\frac{3}{2} - \frac{5}{2}$
		_	13,99	$3d^{2}F - 5fG(5)^{\circ}$	$\frac{5}{2} - \frac{7}{2}$
12384,83	12	$\begin{cases} 13,00 \\ 12,00 \end{cases}$	14,00	• • •	$\frac{7}{2} - \frac{9}{2}$
12381,65	275	11.00	13,00	$3p^{2}D^{\circ} - 3d^{4}P$	$\frac{3}{2} - \frac{3}{2}$
	375	11,99	13,00	$3p^4S^0 - 3d^4P$	$\frac{3}{2} - \frac{5}{2}$
12328,76	350	11,99	13,00	$3p^4S^\circ - 3d^4P$	$\frac{3}{2} - \frac{3}{2}$
12298,55	120	11,84	12,85	$3p^4P^\circ - 4s^4P$	$\frac{3}{2} - \frac{1}{2}$
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
		(11,84	12,85	$3p^{4}P^{0}-4s^{4}P$	$\frac{5}{2} - \frac{3}{2}$
12288,97	260	11,99	13,00	$3p^4S^0 - 3d^4P$	$\frac{3}{2} - \frac{1}{2}$
12270,80	20	11,84	12,85	$3p^4P^0-4s^4P$	$\frac{1}{2} - \frac{1}{2}$
12261,28	27	12,01	13,02	$3p^2D^{\circ} - 3d^4D$	$\frac{5}{2} - \frac{7}{2}$
12250,11	11	12,98	13,99	$3d^4F - 5fG(4)^\circ$	$\frac{7}{2} - \frac{9}{2}$
12231,32	75	11,84	12,85	$3p^{4}P^{\circ} - 4s^{4}P$	$\frac{3}{2} - \frac{3}{2}$
12210,17	12	12,99	14,00	$3d^4F - 5fG(5)^{\circ}$	$\frac{9}{2} - \frac{11}{2}$
12203,93	150	11,84	12,85	$3p^{4}P^{\circ} - 4s^{4}P$	$\frac{1}{2} - \frac{3}{2}$
12186,32	480	11,84	12,86	$3p^4P^0-4s^4P$	$\frac{5}{2} - \frac{5}{2}$
12142,16	12	11,99	13,01	$3p^4S^\circ - 3d^4D$	$\frac{3}{2} - \frac{1}{2}$
12129,97	170	11,84	12,86	$3p^{4}P^{\circ} - 4s^{4}P$	$\frac{3}{2} - \frac{5}{2}$
12124,60	35	11,99	13,02	$3p^{4}S^{\circ} - 3d^{4}D$	$\frac{3}{2} - \frac{3}{2}$
12109,30	25	12,01	13,03	$3p^2D^{\circ} - 3d^2D$	$\frac{5}{2} - \frac{3}{2}$
12106,59	45	11,99	13,02	$3p^4S^0 - 3d^4D$	$\frac{3}{2} - \frac{5}{2}$
12074,51	230	12,01	13,04	$3p^{2}D^{\circ} - 3d^{2}D$ $3p^{2}D^{\circ} - 3d^{2}D$	$\frac{5}{2} - \frac{5}{2}$
11998,36	110	12,00	13,03	•	$\frac{3}{2} - \frac{3}{2}$
11651,45	$\frac{2}{3}$	10,93	11,99	$2p^4 {}^4P - 3p {}^4S^{\circ} \ 2p^4 {}^4P - 3p {}^4S^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
11625, 173 11566, 114	4	10,93 10,92	11 ,99 11 ,99	$2p^{4} {}^{4}P - 3p {}^{4}S^{\circ}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
11323,169	3	11,75	12,85	$3p^{4}D^{\circ}-4s^{4}P$	$^{3}/_{2}^{-}$ _{ $^{2}}/_{2}^{-}$
11313 ,891	4	11,76	12,85	$3p ^4D^{\circ}$ —4s 4P	$^{5}/_{2}$ — $^{3}/_{2}$
11294,238	2	11,75	12,85	$3p^{4}D^{\circ}-4s^{4}P$	1/2-1/2
11291,657	5	11,76	12,86	$3p ^4D^{\circ} - 4s ^4P$	$\frac{7}{2}$ $\frac{5}{2}$
11266 , 198 11237 , 582	2 5 3 2 3	75, 11 11 ,75	12 ,85 12 ,85	$3p {}^{4}D^{\circ} - 4s {}^{4}P 3p {}^{4}D^{\circ} - 4s {}^{4}P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
11227,076	$\overline{3}$	11,76	12,86	$3p^{4}D^{\circ}-4s^{4}P$	5/2 - 5/2
11180,114	1	41,75	12,86	$3p ^4D^{\circ} - 4s ^4P$	$^{3}/_{2}$ — $^{5}/_{2}$
10884,60	2	11,84	12,98	$3p ^4P^{\circ} - 3d ^4F$	$\frac{5}{2}$ $\frac{7}{2}$
10879,19	$\frac{1}{3}$	11,84	12,98	$3p {}^{4}P^{\circ} - 3d {}^{4}F$ $3p {}^{4}P^{\circ} - 3d {}^{2}F$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
10774 ,993 10757 ,888	3 7	11,84 11,84	12 ,99 13 ,01	$3p ^4P ^{\circ} - 3d ^4P$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{5}{2}-\frac{5}{2}}$
10730,510	4	11,84	12,99	$3p {}^{4}P^{\circ} - 3d {}^{2}F$	$\frac{3}{2}$ $\frac{5}{2}$
10717 ,95 4	6	11,84	13,00	$3p ^4P^{\circ} - 3d ^4P$	$\frac{5}{2} - \frac{3}{2}$
10713,550	8 3	11,84	13,01 13,00	$3p {}^{4}P^{\circ} - 3d {}^{4}P \\ 3p {}^{4}P^{\circ} - 3d {}^{2}F$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
10693 ,16 7 10653 ,034	8	11 ,85 11 ,84	13,00	$3p^{4}P^{\circ}-3d^{4}P$	$\frac{1}{2}$
10643 ,981	6	11,84	13,00	$3p ^4P^{\circ} - 3d ^4P$	$^{3/_{2}-^{1}/_{2}}$
10623,381	5	11,84	13,00	$3p^4P^{\circ}-3d^4P$	$^{1}/_{2}$ — $^{1}/_{2}$
10596, 958	6	13 ,72	14,98	$3p' {}^{2}F - 3d' {}^{2}G$	⁷ / ₂ — ⁹ / ₂
10591,905	5 5	13,72	14,98	$3p' {}^{2}F - 3d' {}^{2}G$ $3p {}^{4}P^{\circ} - 3d {}^{4}D$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 3/2 \end{array}$
10563 ,339 10549 ,635	8 8	11,84 11,84	13,02 13 , 02	$3p ^{4}P^{\circ} - 3d ^{4}D$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{5}{2}-\frac{5}{2}}$
10539,554	10	11,84	13,02	$3p ^4P^{\circ} - 3d ^4D$	$^{5}/_{2}$ — $^{7}/_{2}$
10533 ,775	5	11,84	13,01	$3p ^4P^{\circ} - 3d ^4D$	$\frac{3}{2}$ $\frac{1}{2}$
10520 ,574 10513 ,403	8 7	11 ,84 11 ,84	13 ,02 13 ,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{1}{2}$
				$3p ^4P^{\circ} - 3d ^4D$	$\frac{3}{2}$ $\frac{5}{2}$
10506 ,998 10500 ,266	8 6	11 ,84 11 ,84	13,02 13,02	$3p ^4P ^{\circ} - 3d ^4D$	$\frac{1}{2} \frac{1}{2} \frac{3}{2}$
10199,98	2	11,76	12,98	$3p ^4D^{\circ} - 3d ^4F$	$7/_{2}^{-}$ $-5/_{2}$
10166 ,79	3	11,76	12,98	$3p^{4}D^{\circ} - 3d^{4}F$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
10164,849	7 8	11,76 11,76	98, 12 12,98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
10147 ,274 10128 ,285	o 7	11,76	12,98 12,98	$3p ^4D^{\circ} - 3d ^4F$	$\frac{3/2}{2} - \frac{3/2}{2}$ $\frac{7}{2} - \frac{9}{2}$
10125,255	13	11 ,76	12 ,99	$3D^{4}D^{\circ}-3d^{4}F$	$\frac{7}{5}$, $\frac{9}{7}$,
484, 10112	12	11,76	12 ,98	$\frac{3p}{3p} {}^{4}\!\!D^{\circ} - 3d {}^{4}\!\!F 3p {}^{4}\!\!D^{\circ} - 3d {}^{4}\!\!F$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
10108,895	11	75, 11 11 ,75	98, 12 12,98	$3p ^4D^{\circ} - 3a ^4F$ $3p ^4D^{\circ} - 3d ^4F$	$\frac{\frac{1}{2}-\frac{7}{2}}{\frac{1}{2}-\frac{3}{2}}$
10105, 147 10054, 259	10 4	$\frac{11,75}{11,76}$	13,01	$3D^{4}D^{\circ}-3d^{4}P$	$7/_{2}^{-}$ $-5/_{2}^{-}$
10034,200	5	11,76	12,99	$3p ^4D^{\circ} - 3d ^2F$	$^{5}/_{2}$ — $^{5}/_{2}$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
10003 ,055 9997 ,750	5 4	11,76 11,76	13,01 13,00	3p ⁴ D°-3d ⁴ P 3p ⁴ D°-3d ² F	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
9980 ,424 9965 ,736 9947 ,066 9931 ,474 9909 ,220	3 3 4 5 2	11 ,75 11 ,75 11 ,76 11 ,75 11 ,75	12,99 13,01 13,00 13,00 13,00	$3p \ ^4D^{\circ} - 3d \ ^2F$ $3p \ ^4D^{\circ} - 3d \ ^4P$ $3p \ ^4D^{\circ} - 3d \ ^2F$ $3p \ ^4D^{\circ} - 3d \ ^4P$ $3p \ ^4D^{\circ} - 3d \ ^4P$	$\begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array}$
9905,54 9883,369 9872,159 9863,332 9834,623	0 3 6 9 6	11 ,75 11 ,75 11 ,76 11 ,76 11 ,76	13,00 13,00 13,02 13,02 13,02	$3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4D$	$\begin{array}{c} {}^{3}/{}_{2}-{}^{1}/{}_{2} \\ {}^{1}/{}_{2}-{}^{1}/{}_{2} \\ {}^{7}/{}_{2}-{}^{5}/{}_{2} \\ {}^{7}/{}_{2}-{}^{7}/{}_{2} \\ {}^{5}/{}_{2}-{}^{3}/{}_{2} \end{array}$
9822,754 9814,026 9810,018 9798,565 9788,298	7 4 5 5 4	11,76 11,76 11,75 11,75 11,75	13,02 13,02 13,01 13,02 13,01	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array}$
9786 ,788 9776 ,904 9694 ,01 9464 ,23 9460 ,676	4 4 1 1 10	11,75 11,75 11,76 11,60 10,69	13,02 13,02 13,04 12,91 12,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
9392,789 9386,805 9208,001 9207,59 9187,84	15 14 8 3 3	10,69 10,68 12,36 12,36 12,36	12,01 12,00 13,70 13,70 13,70	$3s {}^{2}P - 3p {}^{2}D^{\circ}$ $3s {}^{2}P - 3p {}^{2}D^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}D^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}D^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}D^{\circ}$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
9187 ,449 9060 ,472 9049 ,890	9 10 12	12,36 11,60 12,36	13 ,70 12 ,97 13 ,72	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ} 3p \ ^{2}S^{\circ} - 3d \ ^{2}P 3s' \ ^{2}D - 3p' \ ^{2}F^{\circ}$	$^{5/2}_{1/2}$ $^{3/2}_{2}$ $^{3/2}_{2}$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
9049 ,47 9045 ,878	5 13	12,36 12,36	13,72 13,72	3s' ² D-3p' ² F° 3s' ² D-3p' ² F°	5/2—5/2 5/2—7/2
9028,918 8747,357 8728,909 8718,841 8711,708	9 9 10 14 15	11,60 10,34 10,33 10,34 10,33	12,98 11,75 11,75 11,76 11,75	$3p ^2S^{\circ} - 3d ^2P$ $3s ^4P - 3p ^4D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
8703,255 8686,161 8683,400 8680,270 8655,869	14 14 16 17 14	10,33 10,33 10,33 10,34 10,69	11 ,75 11 ,75 11 ,76 11 ,76 12 ,12	$3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^2P - 3p ^2P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
8629,238 8594,005 8567,735 8242,374 8223,121	16 15 14 13 13	10,69 10,68 10,68 10,34 10,33	12 ,12 12 ,12 12 ,12 11 ,84 11 ,84	$3s {}^{2}P - 3p {}^{2}P^{\circ}$ $3s {}^{2}P - 3p {}^{2}P^{\circ}$ $3s {}^{2}P - 3p {}^{2}P^{\circ}$ $3s {}^{4}P - 3p {}^{4}P^{\circ}$ $3s {}^{4}P - 3p {}^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
8216,317 8210,708 8201,766 8201,43 8200,357	15 11 7 2 10	10,34 10,33 12,36 12,36 10,33	11,84 11,84 13,87 13,87 11,84	$3s ^4P - 3p ^4P^{\circ} \ 3s ^4P - 3p ^4P^{\circ} \ 3s' ^2D - 5p ^2D^{\circ} \ 3s' ^2D - 5p ^2D^{\circ} \ 3s ^4P - 3p ^4P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
8188,005 8184,852 8174,50 8166,51 8166,235	13 13 1 2 8	10,33 10,33 12,12 12,36 12,36	11,84 11,84 13,64 13,87 13,87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 5/_2 - 5/_2 \end{array} $
8150,66 8129,170 8105,631 7915,419 7899,27	1 3 2 7 3	12,12 12,12 12,12 12,36 12,36	13,64 13,65 13,65 13,92 13,92	$3p^{2}P^{\circ}-5s^{2}P$ $3p^{2}P^{\circ}-5s^{2}P$ $3p^{2}P^{\circ}-5s^{2}P$ $3s'^{2}D-3p'^{2}P^{\circ}$ $3s'^{2}D-3p'^{2}P^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
7898,985 7468,309 7442,299 7423,639 6982,02	8 16 15 14	12,36 10,34 10,33 10,33 11,84	13 ,92 11 ,99 11 ,99 11 ,99 13 ,61	$3s' \ ^{2}D - 3p' \ ^{2}P^{\circ}$ $3s \ ^{4}P - 3p \ ^{4}S^{\circ}$ $3s \ ^{4}P - 3p \ ^{4}S^{\circ}$ $3s \ ^{4}P - 3p \ ^{4}S^{\circ}$ $3p \ ^{4}P^{\circ} - 5s \ ^{4}P$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
6979 ,10 6951 ,50 6945 ,22 6926 ,90 6874 ,30	1 1 4 1 1	11,84 11,84 11,84 11,84	13,62 13,62 13,63 13,63	$3p \ ^{4}P^{\circ} - 5s \ ^{4}P$ $3p \ ^{4}P^{\circ} - 5s \ ^{4}P$ $3p \ ^{4}P^{\circ} - 5s \ ^{4}P$ $3p \ ^{4}P^{\circ} - 5s \ ^{4}P$ $- 5s \ ^{4}P$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ - \end{array} $
6793,82 6758,60 6752,40 6741,29 6733,48	00 4 4 3 6	11,84 11,84 11,84 11,84 11,84	13,67 13,67 13,68 13,68 13,68	$3p ^4P^{\circ} - 4d ^4F$ $3p ^4P^{\circ} - 4d ^4D$ $3p ^4P^{\circ} - 4d ^4D$ $3p ^4P^{\circ} - 4d ^4P$ $3p ^4P^{\circ} - 4d ^4P$	$ \begin{array}{r} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
6723 ,42 6713 ,12 6708 ,81 6706 ,20 6666 ,75	9 1 4 4 0	11,84 — 11,84 12,12	13,69 — 13,69 13,99	$3p ^4P^{\circ}-4d ^4P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6656,510 6653,458 6646,510 6644,963 6636,938	1 5 2 9 4	11,75 11,76 11,75 11,76 11,75	13,61 13,62 13,61 13,63 13,62	$3p ^4D^{\circ} - 5s ^4P$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ /2 - 3/2 \end{array} $

λ, Δ	I	E _H , eV	E _B , eV	Transition	J
6627,02 6622,543 6606,77 6506,45 6499,52	0 3 00 0 3	11,75 11,76 11,75 11,76 11,76	13,62 13,63 13,63 13,67 13,66	$3p ^4D^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 4d ^4F$ $3p ^4D^{\circ} - 4d ^4F$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
6491,28 6484,88 6483,75 6482,74 6481,73	3 9 3 9 2	11 ,75 11 ,76 11 ,75 11 ,76 11 ,75	13,66 13,67 13,66 13,68 13,66	$3p ^4D^{\circ} - 4d ^4F$ $3p ^4D^{\circ} - 4d ^4F$ $3p ^4D^{\circ} - 4d ^4F$ $3p ^4D^{\circ} - 4d ^4F$ $3p ^4D^{\circ} - 4d ^4F$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 1/2 - 3/2 \end{array} $
6480 ,50 6471 ,03	0 1	11 ,75 11 ,75	13 ,66 13 ,66	$3p ^4D^{\circ} - 4d ^4D$ $3p ^4D^{\circ} - 4d ^4D$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
6468 ,32	4	11,76	13 ,67	$\left\{\begin{array}{l} 3p\ ^4D^{\circ}-4d\ ^4D \\ 3p\ ^4D^{\circ}-4d\ ^4D \end{array}\right.$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
6457 ,93 6452 ,75	3 1	75, 11 11,75	13 ,67 13 ,67	$3p ^4D^{\circ} - 4d ^4D$ $3p ^4D^{\circ} - 4d ^4D$	$ \begin{array}{r} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
6448 ,49 6441 ,70	0 5	11 ,75 11 ,76	13,67 13,69	$3p$ $^4D^{\circ}$ $-4d$ 4D $3p$ $^4D^{\circ}$ $-4d$ 4P	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$
6440 ,95 6437 ,01 6428 ,05	3 4 00		13 ,68 13 ,68	3p 4D°—4d 4P 3p 4D°—4d 4P	$-\frac{3}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$
6422 ,93 6420 ,47 6417 ,05	$\begin{array}{c} 3 \\ 3 \\ 2 \end{array}$	11,76	 13,69		5/ ₂ 5/ ₂
6321 ,70 6303 ,68	00 0	11,99 11,99	13,93 13,93	$\begin{array}{c} - \\ 3p \ ^4S^{\circ} - 6s \ ^4P \\ 3p \ ^4S^{\circ} - 6s \ ^4P \end{array}$	$\frac{-}{^{3}/_{2}-^{1}/_{2}}$ $\frac{^{3}/_{2}-^{3}/_{2}}{^{3}/_{2}-^{3}/_{2}}$
6285 ,78 6275 ,43 6272 ,83 6075 ,83 6017 ,70	1 1 1 3 2	11,99 12,01 —	13,94 13,99 —	$\begin{array}{c} - \\ 3p\ ^4S^{\circ} - 6s\ ^4P \\ 3p\ ^2D^{\circ} - 5d\ ^2P \\ - \\ - \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6015 ,40 6008 ,48 5999 ,47 5856 ,23 5854 ,16	1 10 6 1 2	 11,60 11,60 11,84 11,84	 13,66 13,67 13,93 13,93	$-3p^{2}S^{\circ}-4d^{2}P$ $3p^{2}S^{\circ}-4d^{2}P$ $3p^{4}P^{\circ}-6s^{4}P$ $3p^{4}P^{\circ}-6s^{4}P$	$\begin{array}{c} - \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array}$
5841 ,01 5834 ,71 5829 ,53 5816 ,48 5793 ,51	2 1 6 2 1	11 ,84 11 ,84 11 ,84 11 ,84	13,93 13,93 13,94 13,94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ \end{array} $
5752 ,64 5747 ,36 5740 ,65 5735 ,63 5667 ,04	4 2 2 1 1	11,84 11,99 —	14,00 14,15 —	3p 4P°-5d 4P 3p 4S°-7s 4P -	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ \\ \end{array} $
5625,43 5623,20 5618,18 5616,54 5611,36	2 4 1 5 1	11 ,75 11 ,76 11 ,75 11 ,76 11 ,75	13,93 13,93 13,93 13,94 13,93	$3p ^4D^{\circ} - 6s ^4P$ $3p ^4D^{\circ} - 6s ^4P$ $3p ^4D^{\circ} - 6s ^4P$ $3p ^4D^{\circ} - 6s ^4P$ $3p ^4D^{\circ} - 6s ^4P$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5604 ,28 5600 ,54 5567 ,63	0 0 1	11,75 11,76	13 ,93 13 ,94	3p ⁴ D°—6s ⁴ P 3p ⁴ D°—6s ⁴ P	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
5564 ,37 5563 ,84	9 3	11,76	13,99	$3p {}^{4}D^{\circ} - 5d {}^{4}F$	5/2—7/ ₂
5560,37 5557,44 5545,11	$\frac{9}{2}$	11,76	14,00	3p 4D°-5d 4F	⁷ / ₂ — ⁹ / ₂
- 5545 ,11 114	3	11 ,76	14,00	$3p ^4D^{\circ}$ — $5d ^4P$	5/ ₂ 5/ ₂

λ, Å	I	E _H , eV	E _B , eV	Transition	J
5540,36 5535,37	1 1			- 3p ² P°-3s ² S	
5411,881 5401,450 5378,45	5 4 0	12,12 12,12 10,93	14,42 14,42 13,23	$3p^{2}P_{-}^{\circ}3s^{2}S$ $2p^{4}^{4}P_{-}^{\circ}4p^{4}D^{\circ}$	$ \begin{array}{c} \frac{3}{2} - \frac{1}{2} \\ \frac{1}{2} - \frac{1}{2} \\ \frac{1}{2} - \frac{1}{2} \end{array} $
5372,66 5371,10 5367,27	3 1 1	10,93 11,84 10,93	13 ,24 14 ,15 13 ,24	$2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P} \stackrel{6}{\circ} $ $3p \stackrel{4}{P} - 7s \stackrel{4}{P} $ $2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P} \stackrel{6}{\circ} $	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
5356 ,77 5344 ,23 5334 ,42	5 00 1	10,93 10,92 11,84	13 ,24 13 ,24 14 ,17	$2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P} \stackrel{6}{\circ} 2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{\circ} 2p \stackrel{4}{\circ} - 6d \stackrel{4}{\circ} 2p \stackrel{4}{\circ} - 6d \stackrel{4}{\circ} 2p \stackrel{6}{\circ} 4p \stackrel{4}{\circ} - 4p \stackrel{4}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
5328 ,70 5310 ,52 5309 ,48	5 1 1	10,92 10,93 10,93	13 ,25 13 ,26 13 ,26	$2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P}^{\circ}$ $2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P}^{\circ}$ $2p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P}^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/3 - 3/2 \end{array} $
5304 ,9 5292 ,75 5281 ,18	1 0 3	10,93 (10,94 10,93 10,92	13,26 13,26 13,27 13,27	$2p^4 \ ^4P - 4p \ ^4P^\circ \ 2p^4 \ ^4P - 4p \ ^4P^\circ \ 2p^4 \ ^4P - 4p \ ^4P^\circ \ 2p^4 \ ^4P - 4p \ ^4P^\circ$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
5201,10 5201,71 5189,51 5187,1	2 1 1	11,60 11,76 10,93	13,57 13,99 14,15 13,32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - $
5181,47 5169,45 5162,78	0 1 1	10,93 10,92	13 ,32 13 ,32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3/2}{5/2}$ $\frac{3/2}{3/2}$ $\frac{3/2}{2}$ $\frac{3/2}{2}$ $\frac{3}{2}$
4935,03 4914,90 4886,30	10 5 2	10,69 10,68	13,20 13,20	3s ² P—4p ² S° 3s ² P—4p ² S°	$\frac{3}{2}$ — $\frac{1}{2}$ $\frac{1}{2}$ — $\frac{1}{2}$
4881 ,79 4847 ,38 4837 ,93	1 2 1		<u>-</u> -	- 	_ _ _
4831 ,16 4753 ,13 4750 ,26	1 2 2	_ _	_ _ _	_ _ _	_ _ _
4744 ,04 4742 ,90	3 2	_	_		
4731 ,22 4685 ,74 4669 ,77	1 3 3 2			_ _ _	— —
4660 ,05 4657 ,72 4656 ,65	1 1	_ _		-	_ _
4651,08 4625,61 4554,21	1 1		_ _ _	_ _ _	_ _ _
4553,38 4503,53 4502,27	1 1 2	_ _ _	_ _	_ _ _	-
4497 ,45 4494 ,67 4492 ,40	1 5 7	_ _ _	_ _ _	_ _ _	
4358 ,27 4343 ,41	10 1	_	_	=	
4336 ,48 4321 ,99 4317 ,70	5 1 5	_ _ _	_ _ _	_ _ _	_ _ _
4313 ,11 4305 ,46 4284 ,92	$\begin{array}{c} 4 \\ 6 \\ 2 \end{array}$	_ 	 	- 	_ _ _
4282 ,20 4281 ,39	$\frac{1}{2}$	_	-	_	-

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
4254 ,7 4253 ,28 4230 ,35 4229 ,59 4224 ,74	4 4 4 2 4	{ 10,33 10,33 10,34 10,34 	13,24 13,24 13,24 13,26 ————————————————————————————————————	$3s {}^{4}P - 4p {}^{4}D^{\circ}$ $3s {}^{4}P - 4p {}^{4}D^{\circ}$ $3s {}^{4}P - 4p {}^{4}D^{\circ}$ $3s {}^{4}P - 4p {}^{4}P^{\circ}$ $-$ $3s {}^{4}P - 4p {}^{4}P^{\circ}$ $3s {}^{4}P - 4p {}^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ - \\ 3/2 - 1/2 \end{array} $
4223,04 4220,79 4215,92 4214,73 4209,05	5 2 2 5 1	10,34 10,33 10,33	13,27 	3s ⁴ P — 4p ⁴ P° 3s ⁴ P — 4p ⁴ P° 3s ⁴ P — 4p ⁴ P° ———————————————————————————————————	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4206,29 4205,65 4193,49 4187,06 4166,64	1 2 3 1 1	_ _ _ _	- 	_ _ _ _ _	_ _ _ _
4151,46 4145,78 4143,4 4137,63 4129,16	$ \begin{array}{c} 12 \\ 2 \\ \hline 7 \\ 1 \end{array} $	10,34 	13,32 — 13,32 13,32 —	3s ⁴ P-4p ⁴ S° 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4113, 972 4109, 959 4102, 18 4099, 951 4037, 35	6 12 2 9 1	10,69 10,69 — 10,68	13,70 13,70 — 13,70	$\begin{array}{c} 3s {}^{2}P - 3p' {}^{2}D^{\circ} \\ 3s {}^{2}P - 3p' {}^{2}D^{\circ} \\ - \\ 3s {}^{2}P - 3p' {}^{2}D^{\circ} \\ - \end{array}$	$^{3/_{2}$ $^{-3/_{2}}$ $^{3/_{2}$ $^{-5/_{2}}$ $^{-1/_{2}}$ $^{-3/_{2}}$
4033,64 4010,99 4001,65 3999,98 3994,86	1 2 1 4 3	 	_ 	_ _ _ _	_ _ _ _
3969 ,95 3957 ,20 3952 ,21 3869 ,10 3834 ,84	1 3 3 4 2	 	 	 - - -	_ _ _ _
3834,24 3830,39 3822,07 3818,27 3687,88	4 9 6 2 2	10,69 10,69 10,68 10,68	13,92 13,92 13,92 13,92	3s ² P — 3p' ² P° 3s ² P — 3p' ² P° 3s ² P — 3p' ² P° 3s ² P — 3p' ² P°	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ \\ \end{array} $
3681,40 3650,49 3545,62 3532,65 3437,14	3 5 2 4 4	 		 - - -	
1889,056 1873,217 1846,399 1836,739 1757,223	2 1 6 4 1		- 10 ,33	$2p^{3} {}^{2}P^{\circ} - 3s {}^{4}P$	$\frac{-}{-}$ $\frac{-}{-}$ $\frac{3}{2}$, $\frac{1}{2}$, $\frac{-1}{2}$
1750,079 1745,249 1742,724 1729,481 1728,170	2 30 10 1 3	3,57 3,57 3,57	10,68 10,69	$\begin{array}{c} - \\ 2p^{3-2}P^{\circ} - 3s^{-2}P \\ 2p^{3-2}P^{\circ} - 3s^{-2}P \\ - \\ - \end{array}$	$\begin{array}{c} - \\ - \\ - \\ 3/2, 1/2 - 1/2 \\ 3/2, 1/2 - 3/2 \\ - \\ - \end{array}$
1721,746 1677,906 1671,020	3 4 1		- 	- -	_ _ _

λ, Å	I	F AV	F AV	Transition	J
Λ, Δ	1	E _H , eV	E _B , eV	1 tansition	J
1647,493 1640,437	3 2	_	_	Ξ	-
1602 ,973 1597 ,181 1592 ,867	1 2 3	_ _	<u> </u>	<u>-</u> -	=
1577 ,131 1542 ,499	1 1	<u> </u>	_	_ _ _	
1494,668 1492,817 1492,624 1481,750 1467,384	60 30 80 4 3	2,38 2,38 2,38 — —	10,68 10,69 10,69 —	$2p^{3} {}^{2}D^{\circ}$ —3s ${}^{2}P$ $2p^{3} {}^{2}D^{\circ}$ —3s ${}^{2}P$ $2p^{3} {}^{2}D^{\circ}$ —3s ${}^{2}P$ —	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
,723 ,723 1462 ,822	$\frac{5}{2}$	_	_	_	<u> </u>
1411 ,939 1411 ,510 1360 ,566	30 1 1	3,57 	12 ,36 — —	$2p^{3} {}^{2}P^{\circ} - 3s' {}^{2}D$	1/ ₂ , 3/ ₂ —3/ ₂ , 5/ ₂ — —
1355,887 1327,927 1326,572 1321,60 1320,83	6 10 15 4 3	3,57 3,57 —	12,91 12,92 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1319,684 1319,003 1318,13	$\frac{30}{20}$	3,57 3,57 —	12,97 12,98	2p ³ ² P°—3d ² P 2p ³ ² P°—3d ² P —	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
1317,41 1316,287	2 1	3,5 7	12,99	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}F$	3/ ₂ —5/ ₂
1315 ,484 1315 ,23 1313 ,47	$\begin{array}{c}1\\2\\3\end{array}$	3,57 <u>-</u> -	13,00 — —	2p ³ ² P°—3d ⁴ P —	³ / ₂ , ¹ / ₂ — ¹ / ₂ —
1313 ,20 1312 ,86	3 3	3 ,5 7 3 ,5 7	13,00 13,01	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{-3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
1312,44 1310,952 1310,548 1310,057 1309,30	3 25 25 1 3	3,57 3,57 —	13,04 13,04 — —	$\begin{array}{c} - \\ 2p^3 \ ^2P^{\circ} - 3d \ ^2D \\ 2p^3 \ ^2P^{\circ} - 3d \ ^2D \\ - \\ - \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1308,86 1280,362	3 1	_	<u> </u>		_
1279 ,995 1243 ,309 1243 ,179	1 15 20	2,38 2,38	12,36 12,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccc} 5/2, & 3/2 - 5/2 \\ 5/2, & 3/2 - 3/2 \end{array}$
1233 ,20 1231 ,588 1230 ,288 1229 ,40	2 1 0 2	3,57 3,57 3,57 —	13 ,63 13 ,65 13 ,65	$2p^{3} {}^{2}P^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 5s {}^{2}P$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1229 ,172	1		49.00		3/2, 1/2—3/2
1228 ,790 1228 ,410	10 5	3,57 3,57	13 ,66 13 ,67	$\begin{pmatrix} 2p^3 & ^2P^{\circ} - 4d & ^4D \\ 2p^3 & ^2P^{\circ} - 4d & ^2P \end{pmatrix}$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{-1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{-1}{2}$
,788,788 1227,226 1227,00	2 1 3	3 ,57 3 ,57 3 ,57	13,67 13,68 13,68	$2p^{3} {}^{2}P^{\circ}$ — $4d {}^{4}D$ $2p^{3} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{3} {}^{2}P^{\circ}$ — $4d {}^{4}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1226,831 1225,85 1225,372 1225,028 1223,80	1 2 10 15 2	3,57 3,57 3,57 3,57 —	13,68 13,69 13,69 13,70	$2p^{3} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{3} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{3} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{3} {}^{2}P^{\circ}$ — $4d {}^{2}D$ —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
1223,20 1200,711 1200,224	$\begin{array}{c} 3 \\ 30 \\ 0 \\ 2 \end{array}$	0,00 0,00	10,33 10,33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$-\frac{3}{3}$ $-\frac{1}{2}$ $-\frac{3}{2}$ $-\frac{3}{2}$
718, 1199 1199, 549	$5\overset{2}{0}$	0,00	10,34	$2p^{3} {}^{4}S^{c} - 3s {}^{4}P$	${}^{3}/_{2}$ ${}^{-}$ $^{5}/_{2}$
1192 ,55 1191 ,99 1191 ,03	2 4 5	3,57 3,57 3,57	13 ,97 13 ,98 13 ,99	$2p^{3} {}^{2}P^{\circ} - 6s {}^{4}P$ $2p^{3} {}^{2}P^{\circ} - 6s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 5d {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1190,84	5	3,57	13,99	$\left\{\begin{array}{l} 2p^{3} {}^{2}P^{\circ} - 5d {}^{2}P \\ 2p^{3} {}^{2}P^{\circ} - 5d {}^{4}D \end{array}\right.$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
1190,52	3	_	_	_	_
1189 ,628 1189 ,244 1188 ,972 1183 ,998	5 3 5 3	3,57 3,57 —	14,00 14,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1177 ,694 1176 ,626	15 3	2,38	12 ,91	$2p^3 \ ^2D^{\circ}$ —4s 2P	$^{3}/_{2}$ — $^{1}/_{2}$
1176,508 1174,84	$\frac{15}{3}$	2,38	12,92 —	$2p^{3} {}^{2}\!D^{\circ} \!$	$\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$
1172 ,55 1172 ,02	$\frac{3}{2}$	3,57 3,57	14,15 14,15	$\frac{2p^3}{2p^3}\frac{^2P^{\circ}}{^2P^{\circ}} - \frac{7s}{7s}\frac{^2P}{^2P^{\circ}}$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$
1171 ,60 1171 ,39	$\frac{2}{2}$	3,57 3,57	14 ,16 14 ,16	$2p^{3} {}^{2}P^{\circ} - 6d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 6d {}^{2}P$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$, $\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$
4171,067	0	$\left\{\begin{array}{c} 2,38\\ 3,57\\ 3,27\end{array}\right.$	12,98 14,16	$2p^{3} 2D^{\circ} - 3d^{2}P$ $2p^{3} 2P^{\circ} - 6d^{2}D$	$\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
1170,276 1169,692	1 1	$egin{array}{c} 2,38 \ 2,38 \end{array}$	12,98 12,98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{7}{2}$
1168,537 1168,334 1167,450 1165,566 1164,322	20 8 25 2 8	2,38 2,38 2,38 2,38 2,38 2,38	12,99 13,01 13,00 13,02 13,03	$2p^{3} \cdot ^{2}D^{\circ} - 3d^{2}F$ $2p^{3} \cdot ^{2}D^{\circ} - 3d^{4}P$ $2p^{3} \cdot ^{2}D^{\circ} - 3d^{2}F$ $2p^{3} \cdot ^{2}D^{\circ} - 3d^{4}D$ $2p^{3} \cdot ^{2}D - 3d^{2}D$	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 7/2$ $5/2 - 7/2$ $5/2 - 3/2$
1163,884 1161,26 1160,67 1160,45 1159,858	12 2 2 3 1	2,38 3,57 3,57 3,57 3,57	13,04 14,25 14,26 14,26 14,26	$2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 8s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 7d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 7d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 7d {}^{2}D$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2, 1/2 - 3/2, 1/2 \\ 3/2, 1/2 - 3/2 \\ 3/2, 1/2 - 3/2 \\ 3/2, 1/2 - 1/2 \\ 3/2, 1/2 - 3/2 \end{array}$
1159 ,285 1158 ,051	1 2	3 ,57	14 ,27	$2p^{3} {}^{2}P^{\circ}$ —7 $d {}^{2}D$	3/25/2
1154 ,23 1153 ,52 1152 ,75	3 4 1	3,57 3,57 3,57	14,32 14,32 14,33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} - \\ 3/2, & 1/2 - 1/2 \\ 3/2, & 1/2 - 3/2 \\ 3/2, & 1/2 - 3/2 \end{array}$
1152 ,35 1149 ,47 1148 ,76 1147 ,69 1145 ,92	4 2 4 4 1	3,57 3,57 3,57 3,57 3,57	14,33 14,36 14,37 14,38 14,39	$2p^{3} \ ^{2}P^{\circ} - 8d \ ^{2}D$ $2p^{3} \ ^{2}P^{\circ} - 10s \ ^{2}P$ $2p^{3} \ ^{2}P^{\circ} - 9d \ ^{2}P$ $2p^{3} \ ^{2}P^{\circ} - 9d \ ^{2}D$ $2p^{3} \ ^{2}P^{\circ} - 11s \ ^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2, 1/2 - 1/2 \\ 3/2, 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2, 1/2 - 1/2 \end{array} $
1145 ,28 1144 ,24 1143 ,649 1143 ,32 1142 ,73	2 2 5 1 2	3,57 3,57 3,57 3,57 3,57	14 ,40 14 ,41 14 ,41 14 ,42 14 ,42	$2p^{3} {}^{2}P^{\circ} - 10d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 10d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3s'' {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 12s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 11d {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1141 ,70 1141 ,20 1140 ,76 1139 ,818 1139 ,15	2 1 2 1	3,57 3,57 3,57 —	14,43 14,44 14,44	$2p^{3} {}^{2}P^{\circ} - 11d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 13s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 12d {}^{2}P$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
1134,981	$\frac{1}{25}$	3,57 0,00	14 ,46 10 ,92	$2p^{3} {}^{2}P^{\circ}$ —12 $d {}^{2}D$ 2 $p^{3} {}^{4}S^{\circ}$ —2 $p^{4} {}^{4}P$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
1134,417 118	25	0,00	10,93	$2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
1134 ,168 1101 ,293 1100 ,362	20 40 30	0,00 2,38 2,38	10 ,93 13 ,64 13 ,65	$2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 5s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 5s {}^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2, 3/2 - 3/2 \end{array} $
1099 ,80 1099 ,153 1098 ,98 1098 ,78 1098 ,63	2 25 2 1 2	2,38 2,38 2,38 - 2,38	13,66 13,67 - 13,67	$\begin{array}{c} - \\ 2p^3 \ ^2D^{\circ} - 4d \ ^4F \\ 2p^3 \ ^2D^{\circ} - 4d \ ^2P \\ - \\ 2p^3 \ ^2D^{\circ} - 4d \ ^4F \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1098,264 1098,103 1097,990 1097,245 1096,749	40 40 25 50 35	2,38 2,38 2,38 2,38 2,38	13 ,67 13 ,68 — 13 ,69 13 ,69	$2p^{3} {}^{2}D^{\circ}$ $-4d {}^{4}D$ $2p^{3} {}^{2}D^{\circ}$ $-4d {}^{2}F$ - $2p^{3} {}^{2}D^{\circ}$ $-4d {}^{2}F$ $2p^{3} {}^{2}D^{\circ}$ $-4d {}^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1096,322 1095,940 1095,279 1071,656 1070,821	35 35 4 1 0	2,38 2,38 - - 2,38	13,69 13,70 — — 13,93	$2p^{3} {}^{2}D^{\circ}$ $-4d {}^{2}D$ $2p^{3} {}^{2}D^{\circ}$ $-4d {}^{2}D$ - - $2p^{3} {}^{2}D^{\circ}$ $-6s {}^{4}P$	5/ ₂ , 3/ ₂ —3/ ₂ 5/ ₂ , 3/ ₂ —5/ ₂ — 5/ ₂ , 3/ ₂ —3/ ₂
1069 ,984 1069 ,198 1068 ,66 1068 ,476 1067 ,607	30 2 4 35 35	2,38 2,38 2,38 2,38 2,38 2,38 2,38 2,38	13 ,94 13 ,99 13 ,98 13 ,99 13 ,99 14 ,00	$2p^3 \ ^2D^{\circ} - 6s \ ^4P$ $2p^3 \ ^2D^{\circ} - 5d \ ^4D$ $2p^3 \ ^2D^{\circ} - 6s \ ^2P$ $2p^3 \ ^2D^{\circ} - 5d \ ^2F$ $2p^3 \ ^2D^{\circ} - 5d \ ^4F$ $2p^3 \ ^2D^{\circ} - 5d \ ^2F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1067,37 1066,97 1066,56 1066,126 1063,351	4 4 3 1 1	2,38 2,38 — — —	14,00 14,00 — — —	$2p^{3} {}^{2}D^{\circ} - 5d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 5d {}^{2}D$ - -	5/ ₂ , 3/ ₂ —3/ ₂ 5/ ₂ , 3/ ₂ —5/ ₂ ————————————————————————————————————
1053,90 1053,65 1053,38 1053,03 1052,72	3 3 5 3 2	2,38 2,38 2,38 2,38 2,38	14 ,15 14 ,15 14 ,15 14 ,15 —	$2p^{3} ^{2}D^{\circ} - 7s ^{4}P$ $2p^{3} ^{2}D^{\circ} - 7s ^{2}P$ $2p^{3} ^{2}D^{\circ} - 6d ^{4}F$ $2p^{3} ^{2}D^{\circ} - 7s ^{3}p$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1052,16 1052,07 1051,89 1044,69 1044,13	3 3 2 4 5	2 ,38 2 ,38 2 ,38 2 ,38 2 ,38	14 ,17 14 ,17 14 ,25 14 ,26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} - \\ 5/_2 - 7/_2 \\ 5/_2, & 3/_2 - 5/_2 \\ & 3/_2 - 1/_2 \\ & 5/_2 - 7/_2 \end{array}$
1043,58 1043,12 1038,90 1038,76 1038,34	2 5 1 1 3	2,38 2,38 2,38 - 2,38	14,26 14,27 14,32 — 14,32	$2p^{3} {}^{2}D^{\circ} - 7d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 7d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 9s {}^{2}P$ $ 2p^{3} {}^{2}D^{\circ} - 8d {}^{2}F$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1037,64 1037,38 1034,96 1034,39 1033,65	1 4 1 2 0	2,38 2,38 3,57 2,38 2,38	14,33 14,33 14,36 14,37 14,38	$2p^{3} {}^{2}D^{\circ} - 8d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 8d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 10s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 9d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 9d {}^{2}D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1033,48 1032,958 1032,19 1031,65 1030,72	3 2 1 2 2	2,38 2,38 2,38 2,38 2,38	14,38 — 14,39 14,40 14,41	$2p^{3} {}^{2}D^{\circ} - 9d {}^{2}D$ $ 2p^{3} {}^{2}D^{\circ} - 11s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 10d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 10d {}^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1029,53 1028,64 1008,875 965,042 964,626	1 2 1 10 5	2,38 2,38 0,00 0,00	14,43 14,44 — 12,85 12,85	$2p^{3} {}^{2}D^{\circ} - 11d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 11d {}^{2}D$ $ 2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
963 ,991 959 ,54 955 ,91 955 ,438 955 ,265	5 3 3 —	0,00 0,00 0,00 0,00 0,00	12,86 12,92 12,97 12,98 12,98	$2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}F$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}F$	3/2 - 5/2 $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
954,11 953,98 953,658 953,415 953,399	3 6 15 15 6	00,00 00,00 	12,99 — 13,00 13,00	$2p^{3} {}^{4}S^{\circ} - 3d {}^{2}F$ $- 2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $$	$ \begin{array}{c} 3/2 - 5/2 \\ - \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ - \end{array} $
952,789 952,522 952,414 952,304 951,35	$\frac{3}{4}$ $\frac{3}{8}$ 1	00, 00 0, 00 0, 00 0, 00 0, 00	13,01 13,01 13,02 13,02 13,03	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
951,08 910,6456 910,2785 909,6976 908,83	3 0 0 0 2	0,00 0,00 0,00 0,00 0,00	13,04 13,61 13,62 13,63 13,64	$2p^{3} {}^{4}S^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5s {}^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
908,23 907,278 906,833 906,722 906,63	3 4 2 1 4	0,00 0,00 0,00 0,00	13,65 13,66 13,67 13,67	$2p^{3} {}^{4}S^{\circ} - 5s {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}D$ $2p^{2} {}^{4}S^{\circ} - 4d {}^{4}D$ $-$	3/2 $3/2$ $3/2$ $1/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$
906,426 906,202 905,829 905,53 905,23	15 10 5 2 4	0,00 0,00 0,00 0,00 0,00	13,68 13,68 13,69 13,69 13,70	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{2}D$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{2}D$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 5/2$
888 ,363 888 ,019 887 ,41 886 ,95 886 ,80	0 0 4 3 3	00,00 00,00 00,00 00,00	13,93 13,93 13,94 13,98 13,98	$2p^{3} {}^{4}S^{\circ} - 6s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 6s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 6s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}F$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}F$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 5/2$
886 ,33 885 ,93 885 ,67 885 ,36 877 ,11	6 3 5 3 2	0,00 0,00 0,00 0,00 0,00	13,99 14,00 14,00 14,00 14,13	$2p^{3} {}^{4}S^{\circ} - 5d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{2}D$ $2p^{3} {}^{4}S^{\circ} - 7s {}^{4}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
876 ,79 876 ,32 875 ,764 875 ,25 875 ,092	2 4 0 5 5	0,00 0,00 0,00 0,00 0,00 0,00	14,14 14,15 14,16 14,17 14,17	$2p^{3} {}^{4}S^{\circ} - 7s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 7s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 6d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 6d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 6d {}^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
871 ,01 870 ,40 870 ,00 869 ,66 868 ,98	1 3 3 5 5	0,00 0,00 0,00 0,00 0,00	14,23 14,24 14,25 14,26 14,27	$2p^{3} {}^{4}S^{\circ} - 8s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 8s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 8s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 7d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 7d {}^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
865,93 865,63 864,93 863,15 862,90	3 5 5 3 5	0,00 0,00 0,00 0,00 0,00	14,32 14,32 14,33 14,36 14,37	$2p^{3} {}^{4}S^{\circ} - 9s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 8d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 8d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 10s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 10s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 9d {}^{4}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
862 ,15 861 ,15 860 ,85	5 1 4	0,00 0,00 0,00	14,38 14,39 14,40	$2p^{3} {}^{4}S^{\circ} - 9d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 11s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 10d {}^{4}D$	3/2 - 5/2 $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$

λ, Å	I	$E_{ m H}$, eV	E_{B} , eV	Transition	.,
860 ,15 859 ,75	4 2	0,00	_ 14 ,42		- 3/ ₂ 5/ ₂
859 ,35 858 ,80 857 ,76	$\begin{array}{c} 3 \\ 2 \\ 2 \end{array}$	00, 0 00, 0 00, 0	14 ,43 14 ,44 14 ,45	$2p^{3} {}^{4}S^{\circ}$ —11 $d {}^{4}D$ $2p^{3} {}^{4}S^{\circ}$ —11 $d {}^{4}P$ $2p^{3} {}^{4}S^{\circ}$ —12 $d {}^{4}P$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
856,80 856,24 855,70	$egin{array}{c} 2 \ 2 \ 2 \end{array}$		<u>-</u> -	· – – –	

N II, ground state $1s^2 2s^2 2p^{2 \ 3}P_0$ Ionization potential 238846,7 cm⁻¹; 29,611 eV

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λ, Å	I	$E_{ m H}$, eV	$E_{ m B},~{ m eV}$	Transition	J
10546,76 10126,27 10118,49 10070,12 10065,15	4 5 4 6 7	25,46 26,19 26,19 26,21 26,21	26,63 27,42 27,42 27,44 27,44	$4p\ ^{1}D$ — $5s\ ^{1}P^{\circ}$ $4f\ G\ (3^{1}/_{2})$ — $5g\ G\ (4^{1}/_{2})^{\circ}$ $4f\ G\ (3^{1}/_{2})$ — $5g\ G\ (4^{1}/_{2})^{\circ}$ $4f\ D\ (2^{1}/_{2})$ — $5g\ F\ (3^{1}/_{2})^{\circ}$ $4f\ D\ (2^{1}/_{2})$ — $5g\ F\ (3^{1}/_{2})^{\circ}$	2-1 4-4, 5 3-4 2-3 3-3, 4
10035,45 10023,27 9969,34 9961,86 9891,09	7 8 7 6 7	26,21 26,21 26,19 26,19 26,17 26,17	27,45 27,45 27,44 27,44 27,42 27,42	$4f G (4^{1}/_{2}) - 5g H (5^{1}/_{2})^{\circ}$ $4f G (4^{1}/_{2}) - 5g H (5^{1}/_{2})^{\circ}$ $4f G (3^{1}/_{2}) - 5g H (4^{1}/_{2})^{\circ}$ $4f G (3^{1}/_{2}) - 5g H (4^{1}/_{2})^{\circ}$ $4f F (3^{1}/_{2}) - 5g G (4^{1}/_{2})^{\circ}$ $4f F (3^{1}/_{2}) - 5g G (3^{1}/_{2})^{\circ}$	4—5 5—5, 6 4—5 3—4 4—4, 5 3—4, 3
9887 ,39 9868 ,21 9865 ,41 9794 ,01 9741 ,43	6 5 6 3 4	26,17 26,16 26,17 26,17 26,17	27,42 27,42 27,42 27,43 27,44	$\begin{array}{c} 4f \ F \ (3^{1}/_{2}) - 5g \ G \ (4^{1}/_{2})^{\circ} \\ 4f \ F \ (2^{1}/_{2}) - 5g \ G \ (3^{1}/_{2})^{\circ} \\ 4f \ F \ (2^{1}/_{2}) - 5g \ G \ (3^{1}/_{2})^{\circ} \\ 4d \ ^{1}F^{\circ} - 5f \ G \ (4^{1}/_{2})^{\circ} \\ 4f \ F \ (3^{1}/_{2}) - 5g \ II \ (4^{1}/_{2})^{\circ} \end{array}$	3—4 2—3 3—4, 3 3—4 4—4, 5
9737 ,75 9722 ,36 9718 ,66 9696 ,77 9694 ,0	4 1 1 1	26,17 26,17 26,17 26,16 26,17	27,44 27,44 27,44 27,44 27,44	$4f F (3^{1}/_{2}) - 5g H (4^{1}/_{2})^{\circ}$ $4f F (3^{1}/_{2}) - 5g F (3^{1}/_{2})^{\circ}$ $4f F (3^{1}/_{2}) - 5g F (3^{1}/_{2})^{\circ}$ $4f F (2^{1}/_{2}) - 5g F (3^{1}/_{2})^{\circ}$ $4f F (2^{1}/_{2}) - 5g F (3^{1}/_{2})^{\circ}$	3—4 4—3, 4 3—3, 4 2—3 3—3, 4
9480 ,73 9453 ,50 9442 ,82 9439 ,40 9431 ,20	1 1 3 1 1	26,13 26,13 26,12 26,12 26,13	27 ,44 27 ,45 27 ,44 27 ,44 27 ,44	$4d\ ^{3}P^{\circ}-5f\ D\ (2^{1}/_{2})$ $4d\ ^{3}P^{\circ}-5f\ D\ (1^{1}/_{2})$ $4d\ ^{3}P^{\circ}-5f\ D\ (2^{1}/_{2})$ $4d\ ^{3}P^{\circ}-5f\ D\ (2^{1}/_{2})$ $4d\ ^{3}P^{\circ}-5f\ D\ (1^{1}/_{2})$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-3 \\ 2-2 \\ 1-1 \end{array} $
9325 ,84 9281 ,06 9266 ,61 9253 ,98 9242 ,02	0 3 1 1 2	25 ,23 26 ,07 26 ,06 26 ,06 26 ,06	26,56 27,41 27,41 27,41 27,41	$4p\ ^3S - 5s\ ^3P^\circ$ $4d\ ^3D^\circ - 5f\ F\ (3^1/_2)$ $4d\ ^3D^\circ - 5f\ F\ (2^1/_2)$ $4d\ ^3D^\circ - 5f\ F\ (3^1/_2)$ $4d\ ^3D^\circ - 5f\ F\ (2^1/_2)$	1—1 3—4 2—3 2—3 1—2
9217,10 9146,40 9121,00 9096,17 9092,93	2 2 1 1 0	25,23 26,07 26,06 26,07 26,07	26 ,58 27 ,43 27 ,43 27 ,44 27 ,44	$4p\ ^3S\ -5s\ ^3P^\circ$ $4d\ ^3D^\circ -5f\ G\ (3^1/_2)$ $4d\ ^3D^\circ -5f\ G\ (2^1/_2)$ $4d\ ^3D^\circ -5f\ D\ (2^1/_2)$ $4d\ ^3D^\circ -5f\ D\ (2^1/_2)$	1—2 3—4 2—3 3—3 3—2
9089 ,45 9069 ,51 9063 ,78 9032 ,04 9010 ,39	1 1 0 1 1	25,20 25,19 26,06 25,19 25,19	26,56 26,56 27,44 26,56 26,56	$4p\ ^3P - 5s\ ^3P^\circ \ 4p\ ^3P - 5s\ ^3P^\circ \ 4d\ ^3D^\circ - 5f\ D\ (2^1/_2) \ 4p\ ^3P - 5s\ ^3P^\circ \ 4p\ ^3P - 5s\ ^3P^\circ \ $	2-1 1-0 2-2 1-1 0-1
					121

λ, Ä	I	E _H , eV	E _B , eV	Transition	J
8986 ,15 8983 ,28 8971 ,36 8930 ,04 8893 ,32	4 3 1 1	25,20 26,03 26,03 25,19 26,25	26,58 27,41 27,41 26,58 27,65	$4p\ ^3P - 5s\ ^3P^\circ$ $4d\ ^1D^\circ - 5f\ F\ (2^1/_2)$ $4d\ ^1D^\circ - 5f\ F\ (3^1/_2)$ $4p\ ^3P - 5s\ ^3P^\circ$ $3s\ ^3P - 3p\ ^3S^\circ$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 2-3 \\ 1-2 \\ 2-1 \end{array} $
8855,40	0	26,25	27,65	$3s ^3P - 3p ^3S^{\circ}$	1—1
8846,46	1	26,03	27,43	$4d ^1D^{\circ} - 5f G (3^{1}/_{2})$	2—3
8819,56	2	26,00	27,41	$4d ^3F^{\circ} - 5f F (3^{1}/_{2})$	3—4
8772,95	3	25,99	27,41	$4d ^3F^{\circ} - 5f F (3^{1}/_{2})$	2—3
8763,39	1	26,01	27,43	$4d ^3F^{\circ} - 5f G (3^{1}/_{2})$	4—4
8710,54 8699,002 8697,79 8694,900 8687,430	$\begin{array}{c} 6 \\ 5 \\ 3 \\ 4 \\ 5 \end{array}$	26 ,01 25 ,14 26 ,00 25 ,13 20 ,67	27,44 26,56 27,43 26,56 22,10	$4d \ ^{3}F^{\circ} - 5f \ G \ (4^{1}/_{2})$ $4p \ ^{3}D - 5s \ ^{3}P^{\circ}$ $4d \ ^{3}F^{\circ} - 5f \ G \ (3^{1}/_{2})$ $4p \ ^{3}D - 5s \ ^{3}P^{\circ}$ $2p^{3} \ ^{1}P^{\circ} - 3p \ ^{1}S$	4-5 2-1 3-4 1-0 1-0
8676,076	7	25, 45	26,58	$4p\ ^3D - 5s\ ^3P^\circ \ 4p\ ^3D - 5s\ ^3P^\circ \ 4d\ ^3F^\circ - 5f\ G\ (3^{1/2}) \ 4d\ ^3F^\circ - 5f\ G\ (4^{1/2}) \ 4p\ ^3D - 5s\ ^3P^\circ \ $	3-2
8660,52	3	25, 13	26,56		1-1
8653,38	3	25, 99	27,43		2-3
8638,31	3	26, 00	27,44		3-4
8604,32	3	25, 14	26,58		2-2
8438 ,742	11	22,40	23,57	$3p ^{1}S - 3d ^{1}P^{\circ}$	0-1 $1-1$ $1-1$ $2-2$ $0-1$
8296 ,205	4	23,57	25,06	$3d ^{1}P^{\circ} - 4p ^{1}P$	
789 ,62	4	25,06	26,63	$3p ^{1}P - 5s ^{1}P^{\circ}$	
776 ,237	10	21,60	23,19	$3p ^{1}D - 3d ^{1}D^{\circ}$	
7256 ,53	2	23,42	25,13	$3d ^{3}P^{\circ} - 4p ^{3}D$	
7215,06	3	23,42	25 ,14	3d ³ P°-4p ³ D	1-2
7188,20	2	23,41	25 ,14	3d ³ P°-4p ³ D	2-2
7138,87	4	23,41	25 ,15	3d ³ P°-4p ³ D	2-3
7014,73	2	23,42	25 ,19	3d ³ P°-4p ³ P	0-1
7013,98	2	23,42	25 ,19	3d ³ P°-4p ³ P	1-0
6975,64	4	23,41	25,19	3d ³ P°-4p ³ P	2—1
6966,81	3	23,42	25,20	3d ³ P°-4p ³ P	1—2
6941,752	5	23,41	25,20	3d ³ P°-4p ³ P	2—2
6887,834	5	28,49	30,29	3p ⁵ S°-3d ⁵ P	2—3
6869,580	4	28,49	30,29	3p ⁵ S°-3d ⁵ P	2—2
6857,030	3	28,49	30,30	$3p {}^{5}S^{\circ} - 3d {}^{5}P$	2-1
6847,237	4	23,42	25,23	$3d {}^{3}P^{\circ} - 4p {}^{3}S$	0-1
6834,094	6	23,42	25,23	$3d {}^{3}P^{\circ} - 4p {}^{3}S$	1-1
6809,989	7	23,41	25,23	$3d {}^{3}P^{\circ} - 4p {}^{3}S$	2-1
6801,31	1	24,39	26,21	$4s {}^{3}P^{\circ} - 4f D (2^{1}/_{2})$	2-3
6634,789	3	24,39	26,25	$4s ^3P^{\circ} - 3s ^3P$	$ \begin{array}{c} 2-1 \\ 2-1 \\ 2-2 \\ 2-3 \\ 1-0 \end{array} $
6629,795	7	23,19	25,06	$3d ^1D^{\circ} - 4p ^1P$	
6613,622	5	24,39	26,26	$4s ^3P^{\circ} - 3s ^3P$	
6610,565	13	21,60	23,47	$3p ^1D - 3d ^1F^{\circ}$	
6595,666	3	24,37	26,25	$4s ^3P^{\circ} - 3s ^3P$	
6564,20 6561,78 6560,203 6554,47 6545,530	3 3 3 3	23,57 24,37 24,37 23,24 23,24	25,46 26,26 26,25 25,13 25,14	$3d ^{1}P^{\circ} - 4p ^{1}D$ $4s ^{3}P^{\circ} - 3s ^{1}P^{\circ}$ $4s ^{3}P^{\circ} - 3s ^{1}P^{\circ}$ $3d ^{3}D^{\circ} - 4p ^{3}D$ $3d ^{3}D^{\circ} - 4p ^{3}D$	1—2 1—2 0—1 2—1 3—2
6544,162	4	23,24	25,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	11
6532,550	5	23,24	25,14		22
6522,39	2	23,24	25,14		12
6504,608	6	23,24	25,15		33
6491,79	2	23,24	25,15		23
6482,053	13	18,50	20 ,41	$3s {}^{1}P^{\circ} - 3p {}^{1}P$ $2p^{3} {}^{3}S^{\circ} - 3p {}^{3}P$ $2p^{3} {}^{3}S^{\circ} - 3p {}^{3}P$	1—1
6457,69	0	19,23	21 ,15		1—1
6433,45	1	19,23	21 ,16		1—2

λ, λ	I	E_{H} , eV	E _B , eV	Transition	J
6399 ,16	2 2	23 ,19	25,13	3d ¹ D°-4p ³ D	2—1
6384 ,31		23 ,12	25,06	3d ³ F°-4p ¹ P	2—1
6379,615	9	18,46	20,41	$3s ^3P^{\circ} - 3p ^1P$ $3d ^3D^{\circ} - 4p ^3P$	1—1
6357,569	5	23,24	25,19		1—0
6356,545	6	23,24	25,19		2—1
6346,86	5	23,24	25,19		1—1
6340,569	7	23,24	25,20		3—2
6328,39	5	23,24	25,20	$3d ^{3}D^{\circ}-4p ^{3}P$	2-2
6318,80	1	23,24	25,20	$3d ^{3}D^{\circ}-4p ^{3}P$	1-2
6285,70	2	21,16	23,13	$3p ^{3}P-3d ^{3}F^{\circ}$	2-3
6284,322	6	21,60	23,57	$3p ^{1}D-3d ^{1}P^{\circ}$	2-1
6242,412	7	23,47	25,46	$3d ^{1}F^{\circ}-4p ^{1}D$	3-2
6218,67	0	23,24	25, 23	3d ³ D°—4p ³ S	2-1
6183,68	0	28,36	30, 36	3p ³ D°—3d ⁵ D	3-3
6173,313	7	23,13	25, 14	3d ³ F°—4p ³ D	3-2
6170,166	6	23,12	25, 13	3d ³ F°—4p ³ D	2-1
6167,755	8	23,14	25, 15	3d ³ F°—4p ³ D	4-3
6150,755	4	23,12	25,14	$3d ^3F^{\circ}-4p ^3D$	$ \begin{array}{c} 2-2 \\ 3-3 \\ 1-2 \\ 2-1 \\ 1-0 \end{array} $
6136,894	4	23,13	25,15	$3d ^3F^{\circ}-4p ^3D$	
6065,00	3	21,15	23,19	$3p ^3P-3d ^1D^{\circ}$	
5960,901	4	21,16	23,24	$3p ^3P-3d ^3D^{\circ}$	
5954,276	5	23,57	25,58	$3d ^1P^{\circ}-4p ^1S$	
5952,388	8	21,16	23 ,24	$3p ^3P - 3d ^3D^{\circ}$	$ \begin{array}{c} 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \\ 0-1 \end{array} $
5941,653	12	21,16	23 ,24	$3p ^3P - 3d ^3D^{\circ}$	
5940,240	8	21,15	23 ,24	$3p ^3P - 3d ^3D^{\circ}$	
5931,779	11	21,15	23 ,24	$3p ^3P - 3d ^3D^{\circ}$	
5927,811	9	21,15	23 ,24	$3p ^3P - 3d ^3D^{\circ}$	
5899,83	1	26,25	28,35	$3s ^{3}P - 3p ^{3}D^{\circ}$	0-1 $1-2$ $2-3$ $1-1$ $1-2$
5897,25	2	26,26	28,35	$3s ^{3}P - 3p ^{3}D^{\circ}$	
5893,15	3	26,26	28,36	$3s ^{3}P - 3p ^{3}D^{\circ}$	
5767,440	7	18,50	20,64	$3s ^{1}P^{\circ} - 3p ^{3}D$	
5747,296	8	18,50	20,64	$3s ^{1}P^{\circ} - 3p ^{3}D$	
5730,65	5	18,47	20,64	$3s ^{3}P^{\circ} - 3p ^{3}D$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-1 \\ 2-3 \\ 0-1 \end{array} $
5710,766	10	18,47	20,64	$3s ^{3}P^{\circ} - 3p ^{3}D$	
5686,213	10	18,46	20,64	$3s ^{3}P^{\circ} - 3p ^{3}D$	
5679,562	14	18,47	20,66	$3s ^{3}P^{\circ} - 3p ^{3}D$	
5676,019	11	18,46	20,64	$3s ^{3}P^{\circ} - 3p ^{3}D$	
5666,627	12	18,46	20,66	$3s ^{3}P^{\circ} - 3p ^{3}D$	1-2
5631,72	1	25,46	27,66	$4p ^{1}D - 6s ^{1}P^{\circ}$	2-1
5565,25	3	25,51	27,72	$3s ^{5}P - 3p ^{5}D^{\circ}$	3-2
5552,67	4	25,50	27,72	$3s ^{5}P - 3p ^{5}D^{\circ}$	2-1
5551,922	5	25,51	27,73	$3s ^{5}P - 3p ^{5}D^{\circ}$	3-3
5543 ,471 5540 ,059 5535 ,363 5530 ,244	5 4 8 7	25,50 25,49 25,49 25,51 25,50 25,60	27,72 27,72 27,72 27,74 27,73	$3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3s {}^{5}P - 3p {}^{5}D^{\circ}$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 1-1 \\ 3-4 \\ 2-3 \\ 1-2 \end{array} $
5526,239 5495,666 5493,22 5480,062 5478,096 5475,29	5 10 1 7 7 4	25,49 21,16 20,94 21,16 21,15 23,19	27,72 23,41 23,19 23,42 23,42 25,46	$3p \ ^{3}P - 3d \ ^{3}P^{\circ}$ $3p \ ^{3}S - 3d \ ^{1}D^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}P^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}P^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}P^{\circ}$ $3d \ ^{1}D^{\circ} - 4p \ ^{1}D$	2-2 1-2 2-1 1-2 2-2
5462,592 5454,221 5452,083 5390,68 5383,71	7 7 7 1 2	21,15 21,15 21,15 21,15 20,94 20,94	23,42 23,42 23,42 23,42 23,24 23,24	3p 3P-3d 3P° 3p 3P-3d 3P° 3p 3P-3d 3P° 3p 3S-3d 3D° 3p 3S-3d 3D°	1—1 1—0 0—1 1—1 1—2

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
5351,220	4	27,98	30,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3—3
5340,213	3	27,98	30,29		3—2
5338,732	4	27,97	30,29		2—3
5327,76	1	27,97	30,29		2—2
5320,953	4	27,97	30,29		1—2
5320,203	3	27,97	30,30	$3p \ ^5P^{\circ} - 3d \ ^5P$	2-1
5313,419	2	27,97	30,30	$3p \ ^5P^{\circ} - 3d \ ^5P$	1-1
5260,57	2	26,26	28,62	$3s \ ^3P - 3p \ ^3P^{\circ}$?	2-2
5205,11	0	25,23	27,62	$4p \ ^3S - 6s \ ^3P^{\circ}$	1-1
5199,48	1	27,74	30,42	$3p \ ^5D^{\circ} - 3d \ ^5F$	4-3
5191 ,97 5190 ,380 5186 ,200 5184 ,964 5183 ,200	$\frac{2}{4}$ $\frac{2}{4}$ $\frac{4}{4}$	$\begin{array}{c} 27,73 \\ 27,74 \\ 27,98 \\ 27,72 \\ 27,73 \\ 27,98 \end{array}$	30,12 30,13 30,36 30,12 30,12 30,36	$3p ^5D^{\circ} - 3d ^5F$ $3p ^5D^{\circ} - 3d ^5F$ $3p ^5P^{\circ} - 3d ^5D$ $3p ^5P^{\circ} - 3d ^5F$ $3p ^5D^{\circ} - 3d ^5F$ $3p ^5P^{\circ} - 3d ^5D$	3-2 4-4 3-2 2-1 3-3 3-3
5180,352	4	27,72	30,12	$3p \ ^5D^{\circ} - 3d \ ^5F$ $3p \ ^5D^{\circ} - 3d \ ^5F$ $3p \ ^5P^{\circ} - 3d \ ^5D$ $3p \ ^5D^{\circ} - 3d \ ^5F$ $3p \ ^5D^{\circ} - 3d \ ^5F$ $3p \ ^5P^{\circ} - 3d \ ^5D$	2-2
5179,52	7	27,74	30,13		4-5
5179,35	7	27,98	30,36		3-4
5177,060	4	27,72	30,12		1-1
5176,563	2	27,97	30,36		2-1
5175,891	6	27,73	30,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4
5174,463	4	27,97	30,36		2-2
5173,386	5	27,72	30,12		2-3
5172,970	3	27,72	30,12		0-1
5172,346	4	27,72	30,12		1-2
5171,45	4	27,97	30,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3
5171,30	2	27,97	30,36		1-0
5170,168	4	27,97	30,36		1-1
5168,99	1	25,23	27,64		1-2
5168,056	4	27,97	30,36		1-2
5104,437	5	22,10	24,53	3p ¹ S-4s ¹ P°	0-1
5095,58	1	25,20	27,64	4p ³ P-6s ³ P°	2-2
5073,590	5	18,50	20,94	3s ¹ P°-3p ³ S	1-1
5046,51	2	25,20	27,65	4p ³ P-3p ³ S°	2-1
5045,100	11	18,47	20,94	3s ³ P°-3p ³ S	2-1
5040 ,72	3	20,66	23 ,12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2
5028 ,81	1	25,19	27 ,65		1-1
5025 ,662	9	20,66	23 ,13		3-3
5023 ,048	5	25,51	27 ,97		3-2
5022 ,06	0	25,19	27 ,65		0-1
5016,387	9	20,65	23 ,12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2
5012,029	6	25,51	27 ,98		3—3
5011,30	5	25,50	27 ,97		2—1
5010,620	10	18,46	20 ,94		1—1
5007,325	11	20,94	23 ,41		1—2
5005,149 5003,88 5002,703 5001,477 5001,136	14 0 9 12 11	25,50 20,66 25,14 18,46 20,64 20,64	27,97 23,14 27,62 20,94 23,13 23,12	$3s ^5P - 3p ^5P^{\circ}$ $3p ^3D - 3d ^3F^{\circ}$ $4p ^3D - 6s ^3P^{\circ}$ $3s ^3P^{\circ} - 3p ^3S$ $3p ^3D - 3d ^3F^{\circ}$ $3p ^3D - 3d ^3F^{\circ}$	2-2 3-4 2-1 0-1 2-3 1-2
4997,227 4994,363 4991,240	4 10 5	$ \begin{cases} 25,49 \\ 20,94 \\ 25,50 \\ 25,15 \\ 25,49 \end{cases} $	27,97 23,42 27,98 27,64 27,97	$3s {}^{5}P - 3p {}^{5}P^{\circ} \ 3p {}^{3}S - 3d {}^{3}P^{\circ} \ 3s {}^{5}P - 3p {}^{5}P^{\circ} \ 4p {}^{3}D - 6s {}^{3}P^{\circ}$	$ \begin{array}{c} 1-1 \\ 1-1 \\ 2-3 \\ 3-2 \end{array} $
4987 ,367 4895 ,111	8	20,94 20,94 17,88	23,42 20,41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—0 2—1

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4860 ,170 4810 ,306 4803 ,289 4793 ,650 4788 ,131	4 4 10 4 8	20,64 20,66 20,66 20,64 20,64	23,19 23,24 23,24 23,24 23,24 23,24	$3p \ ^{3}D - 3d \ ^{1}D^{\circ}$ $3p \ ^{3}D - 3d \ ^{3}D^{\circ}$ $3p \ ^{3}D - 3d \ ^{3}D^{\circ}$	1-2 3-2 3-3 2-1 2-2
4781 ,190 4779 ,722 4774 ,241 4721 ,57 4718 ,38	4 7 4 2 4	20,64 20,64 20,64 27,74 27,74	23,24 23,24 23,24 23,24 30,36 30,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 1-1 1-2 4-3 4-4
4712,07	2	27,73	30,36	$3p \ ^5D^{\circ} - 3d \ ^5D$	3-2
4709,59	2	27,73	30,36	$3p \ ^5D^{\circ} - 3d \ ^5D$	3-3
4706,40	2	27,73	30,36	$3p \ ^5D^{\circ} - 3d \ ^5D$	3-4
4704,24	2	27,72	30,36	$3p \ ^5D^{\circ} - 3d \ ^5D$	2-1
4702,51	2	27,72	30,36	$3p \ ^5D^{\circ} - 3d \ ^5D$	2-2
4700,04	2	27,72	30,36	$3p ^5D^{\circ} - 3d ^5D$	2-3
4698,55	1	27,72	30,36	$3p ^5D^{\circ} - 3d ^5D$	1-0
4695,89	2	27,72	30,36	$3p ^5D^{\circ} - 3d ^5D$	1-2
4694,637	6	23,57	26,21	$3d ^1P^{\circ} - 4f D (2^1/2)$	1-2
4678,14	6	23,57	26,22	$3d ^1P^{\circ} - 4f D (1^1/2)$	1-2
4674,909	5	18,50	21,15	$3s ^{1}P^{\circ} - 3p ^{3}P$ $3s ^{1}P^{\circ} - 3p ^{3}P$ $3s ^{1}P^{\circ} - 3p ^{3}P$ $3s ^{3}P^{\circ} - 3p ^{3}P$ $3s ^{3}P^{\circ} - 3p ^{3}P$ $3s ^{3}P^{\circ} - 3p ^{3}P$	1-0
4667,206	5	18,50	21,15		1-1
4654,532	5	18,50	21,16		1-2
4643,085	11	18,47	21,15		2-1
4630,543	14	18,47	21,15		2-2
4621,394	10	18,46	21 ,15	$3s ^3P^{\circ} - 3p ^3P$	1-0
4613,866	9	18,46	21 ,15	$3s ^3P^{\circ} - 3p ^3P$	1-1
4608,085	3	23,47	26 ,16	$3d ^1F^{\circ} - 4f F (2^{1/2})$	3-3
4607,157	10	18,46	21 ,15	$3s ^3P^{\circ} - 3p ^3P$	0-1
4602,53	3	23,47	26 ,17	$3d ^1F^{\circ} - 4f F (3^{1/2})$	3-3
4601 ,480		18,46	21,16	$3s ^3P^{\circ} - 3p ^3P$	1-2
4564 ,764		20,41	23,12	$3p ^1P - 3d ^3F^{\circ}$	1-2
4552 ,527		23,47	26,19	$3d ^1F^{\circ} - 4f G (3^1/2)$	3-4
4530 ,410		23,47	26,21	$3d ^1F^{\circ} - 4f G (4^1/2)$	3-4
4508 ,77		23,41	26,16	$3d ^3P^{\circ} - 4f F (2^1/2)$	2-3
4507,557	6	20,66	23,41	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2
4488,12	2	20,64	23,41		2-2
4477,691	4	20,64	23,42		2-1
4465,527	2	20,64	23,42		1-1
4459,933	3	20,64	23,41		1-0
4447,033 4442,018 4433,475 4432,735 4431,816	6 5	20,41 23,42 23,42 23,41 23,41	23,19 26,21 26,22 26,21 26,21	$3p \ ^3D - 3d \ ^3D^{\circ}$ $3d \ ^3P^{\circ} - 4f \ D \ (2^{1}/2)$ $3d \ ^3P^{\circ} - 4f \ D \ (4^{1}/2)$ $3d \ ^3P^{\circ} - 4f \ D \ (2^{1}/2)$ $3d \ ^3P^{\circ} - 4f \ D \ (2^{1}/2)$	1-2 1-2 0-1 2-3 2-2
4427,964	4	23,42	26,22	$\begin{array}{c} 3d\ ^3P^{\circ}-4f\ D\ (1^{1}/2)\\ 3d\ ^3P^{\circ}-4f\ D\ (1^{1}/2)\\ 3d\ ^3P^{\circ}-4f\ D\ (1^{1}/2)\\ 3d\ ^3P^{\circ}-4f\ D\ (1^{1}/2)\\ 3p\ ^1P-3d\ ^3D^{\circ} \end{array}$	1-1
4427,236	5	23,42	26,22		1-2
4417,82	1	23,41	26,21		2-1
4417,07	4	23,41	26,21		2-2
4374,98	2	20,41	23,24		1-2
4247,31 4247,20 4242,489 4241,784	10	$ \begin{array}{c} 20,64 \\ 23,24 \\ 23,24 \\ 23,24 \\ 23,24 \\ 23,24 \end{array} $	23,57 26,16 26,17 26,17 26,16	$3p \ ^3D - 3d \ ^1P^\circ$ $3d \ ^3D^\circ - 4f \ F \ (2^1/2)$ $3d \ ^3D^\circ - 4f \ F \ (3^1/2)$ $3d \ ^3D^\circ - 4f \ F \ (3^1/2)$ $3d \ ^3D^\circ - 4f \ F \ (2^1/2)$ $3d \ ^3D^\circ - 4f \ F \ (2^1/2)$	2-1 3-3 3-3 3-4 2-3 2-2
4241 ,240 4237 ,05 4236 ,91	3 7 8	23,24 23,24 23,24	26,16 26,17 26,16	$3d \ ^{3}D^{\circ} - 4f \ F \ (2^{1/2})$ $3d \ ^{3}D^{\circ} - 4f \ F \ (2^{1/2})$ $3d \ ^{3}D^{\circ} - 4f \ F \ (2^{1/2})$	2—3 1—2

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4227 ,743	8	21,60	24,53	3p ¹ D-4s ¹ P°	2—1
4209 ,09	0	30,36	33,32	3d ⁵ D-4f ⁵ F°	4—4
4207 ,50	3	30,36	33,32	3d ⁵ D-4f ⁵ F°	4—5
4206,51	2	30,36	33,32	$3d\ ^5D-4f\ ^5F^\circ \ 3d\ ^5D-4f\ ^5F^\circ \ 3d\ ^3D^\circ-4f\ G\ (3^{1}/2) \ 3d\ ^3D^\circ-4f\ G\ (3^{1}/2) \ 3d\ ^3D^\circ-4f\ G\ (3^{1}/2)$	3-4
4206,11	1	30,36	33,32		2-3
4201,35	1	23,24	26,19		3-3
4199,980	5	23,24	26,19		3-4
4195,974	3	23,24	26,19		2-3
4181,10	$\frac{2}{5}$ 0 8 3	23,24	26,21	$3d\ ^3D^{\circ}$ —4f $G\ (4^{1}/2)$	3-4
4179,674		23,24	26,21	$3d\ ^3D^{\circ}$ —4f $D\ (2^{1}/2)$	3-3
4178,86		23,24	26,21	$3d\ ^3D^{\circ}$ —4f $D\ (2^{1}/2)$	3-2
4176,161		23,19	26,16	$3d\ ^1D^{\circ}$ —4f $F\ (2^{1}/2)$	2-3
4173,572		23,24	26,21	$3d\ ^3D^{\circ}$ —4f $D\ (2^{1}/2)$	2-2
4171,607	6	23,19	26,17	$3d\ ^{1}D^{\circ}$ —4f $F\ (3^{1}/_{2})$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 2 - 1 \\ 2 - 2 \\ 1 - 1 \end{array} $
4169,38	1	23,24	26,21	$3d\ ^{3}D^{\circ}$ —4f $D\ (2^{1}/_{2})$	
4161,14	1	23,24	26,22	$3d\ ^{3}D^{\circ}$ —4f $D\ (1^{1}/_{2})$	
4160,50	2	23,24	26,22	$3d\ ^{3}D^{\circ}$ —4f $D\ (1^{1}/_{2})$	
4157,01	3	23,24	26,22	$3d\ ^{3}D^{\circ}$ —4f $D\ (1^{1}/_{2})$	
4156,39	1	23,24	26,22	3d ³ D°-4f D (1 ¹ / ₂)	1-2
4154,77	2	30,29	33,28	3d ⁵ P-4f ⁵ D°	3-4
4145,776	6	25,51	28,49	3s ⁵ P-3p ⁵ S°	3-2
4133,672	5	25,50	28,49	3s ⁵ P-3p ⁵ S°	2-2
4131,782	4	23,19	26,19	3d ¹ D°-4f G (3 ¹ / ₂)	2-3
4124,078	4	25,49	28,49	$3s {}^{5}P - 3p {}^{5}S^{\circ}$	1-2 $1-1$ $2-3$ $2-2$ $2-2$
4114,36	0	20,41	23,42	$3p {}^{1}P - 3d {}^{3}P^{\circ}$	
4110,83	2	23,19	26,21	$3d {}^{1}D^{\circ} - 4f D (2^{1}/_{2})$	
4110,04	3	23,19	26,21	$3d {}^{1}D^{\circ} - 4f D (2^{1}/_{2})$	
4097,3 coi	nc.N III	23,19	26,22	$3d {}^{1}D^{\circ} - 4f D (4^{1}/_{2})$	
4096,58	0	23 ,14	26 ,17	$3d\ ^3F^{\circ}$ — $4f\ F\ (3^{1}/_{2})$	4-3
4095,904	4	23 ,14	26 ,17	$3d\ ^3F^{\circ}$ — $4f\ F\ (3^{1}/_{2})$	4-4
4087,303	3	23 ,13	26 ,16	$3d\ ^3F^{\circ}$ — $4f\ F\ (2^{1}/_{2})$	3-3
4082,89	1	23 ,13	26 ,17	$3d\ ^3F^{\circ}$ — $4f\ F\ (3^{1}/_{2})$	3-3
4082,270	5	23 ,13	26 ,17	$3d\ ^3F^{\circ}$ — $4f\ F\ (3^{1}/_{2})$	3-4
4076,908	3	23,12	26,16	$3d\ ^3F^{\circ}$ — $4f\ F\ (2^{1}/_{2})$	2-2
4073,042	6	23,12	26,17	$3d\ ^3F^{\circ}$ — $4f\ F\ (3^{1}/_{2})$	2-3
4056,90	4	23,14	26,19	$3d\ ^3F^{\circ}$ — $4f\ G\ (3^{1}/_{2})$	4-4
4044,777	4	23,13	26,19	$3d\ ^3F^{\circ}$ — $4f\ G\ (3^{1}/_{2})$	3-3
4043,529	9	23,13	26,19	$3d\ ^3F^{\circ}$ — $4f\ G\ (3^{1}/_{2})$	3-4
4041 ,311	11	23 ,14	26,21	$3d\ ^3F^{\circ}$ — $4f\ G\ (4^{1}/_{2})$	4-5
4039 ,345	2	23 ,14	26,21	$3d\ ^3F^{\circ}$ — $4f\ G\ (4^{1}/_{2})$	4-4
4037 ,96	1	23 ,14	26,21	$3d\ ^3F^{\circ}$ — $4f\ D\ (2^{1}/_{2})$	4-3
4035 ,080	9	23 ,12	26,19	$3d\ ^3F^{\circ}$ — $4f\ G\ (3^{1}/_{2})$	2-3
4026 ,075	7	23 ,13	26,21	$3d\ ^3F^{\circ}$ — $4f\ G\ (4^{1}/_{2})$	3-4
3994 ,998	15	.18 ,50	21,60	$3s {}^{1}P^{\circ} - 3p {}^{1}D$	1—2
3955 ,851	10	18 ,46	21,60	$3s {}^{3}P^{\circ} - 3p {}^{1}D$	1—2
3941 ,23	1	30 ,12	33,28	$3d {}^{5}F - 4f {}^{5}G^{\circ}$	3—4
3940 ,66	2	30 ,13	33,28	$3d {}^{5}F - 4f {}^{5}G^{\circ}$	4—5
3939 ,57	4	30 ,13	33,29	$3d {}^{5}F - 4f {}^{5}G^{\circ}$	5—6
3918 ,999	9	20,41	23,57	3p ¹ P-3d ¹ P°	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 1 - 0 \\ 1 - 1 \\ 0 - 1 \end{array} $
3856 ,057	6	21,16	24,38	3p ³ P-4s ³ P°	
3855 ,100	5	21,15	24,37	3p ³ P-4s ³ P°	
3847 ,409	5	21,15	24,38	3p ³ P-4s ³ P°	
3842 ,183	5	21,15	24,38	3p ³ P-4s ³ P°	
3838 ,374 3829 ,793 3615 ,858 3609 ,097 3593 ,597	8 6 2 4 5	21,16 21,15 20,94 20,94 20,94	24,39 24,39 24,37 24,38 24,39	3p 3P-4s 3P° 3p 3P-4s 3P° 3p 3S-4s 3P° 3p 3S-4s 3P° 3p 3S-4s 3P° 3p 3S-4s 3P°	$ \begin{array}{c} 2-2 \\ 1-2 \\ 1-0 \\ 1-1 \\ 1-2 \end{array} $
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λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
3437 ,147	9	18,50	22 ,10	$3s ^{1}P^{\circ} - 3p ^{1}S$	1—0
3408 ,127	5	18,46	22 ,10	$3s ^{3}P^{\circ} - 3p ^{1}S$	1—0
3331 ,310	6	20,64	24 ,38	$3p ^{3}D - 4s ^{3}P^{\circ}$	2—1
3330 ,314	5	20,61	24 ,37	$3p ^{3}D - 4s ^{3}P^{\circ}$	1—0
3329 ,704	5	17,88	21 ,60	$2p ^{3} ^{1}D^{\circ} - 3p ^{1}D$	2—2
3328 ,730 3324 ,573 3318 ,098 3206 ,709 3200 ,685	7 5 5 2 2	20,66 20,64 20,65 23,57 23,57	24,39 24,37 24,39 27,44 27,45	$\begin{array}{c} 3p \ ^3D - 4s \ ^3P^{\circ} \\ 3p \ ^3D - 4s \ ^3P^{\circ} \\ 3p \ ^3D - 4s \ ^3P^{\circ} \\ 3d \ ^1P^{\circ} - 5f \ D \ (2^{1/2}) \\ 3d \ ^1P^{\circ} - 5f \ D \ (1^{1/2}) \end{array}$	3-2 $ 1-1 $ $ 2-2 $ $ 1-2 $ $ 1-2$
3126,40	3	23 ,47	27 ,44	$3d {}^{1}F^{\circ} - 5f G (4^{1}/_{2})$	3-4
3086,78	2	23 ,42	27 ,44	$3d {}^{3}P^{\circ} - 5f D (2^{1}/_{2})$	1-2
3084,155	2	23 ,42	27 ,45	$3d {}^{3}P^{\circ} - 5f D (4^{1}/_{2})$	0-1
3082,191	4	23 ,41	27 ,44	$3d {}^{3}P^{\circ} - 5f D (2^{1}/_{2})$	2-3
3081,485	2	23 ,42	27 ,45	$3d {}^{3}P^{\circ} - 5f D (1^{1}/_{2})$	1-1
3081 ,222	2	23,42	27,45	$3d \ ^{3}P^{\circ}-5f \ D \ (1^{1}/_{2})$ $3p \ ^{1}S-4d \ ^{1}P^{\circ}$ $3p \ ^{1}P-4s \ ^{1}P^{\circ}$ $3d \ ^{3}D^{\circ}-5f \ F \ (3^{1}/_{2})$ $3d \ ^{3}D^{\circ}-5f \ F \ (3^{1}/_{2})$	1-2
3023 ,668	4	22,10	26,20		0-1
3006 ,830	7	20,41	24,53		1-1
2976 ,971	4	23,24	27,41		3-4
2974 ,65	2	23,24	27,41		2-3
2973 ,601	3	23,24	27,41	$3d \ ^3D^{\circ} - 5f \ F \ (2^1/2)$	1—2
2962 ,953	4	23,24	27,43	$3d \ ^3D^{\circ} - 5f \ G \ (3^1/2)$	3—4
2943 ,495	4	23,19	27,41	$3d \ ^1D^{\circ} - 5f \ F \ (2^1/2)$	2—3
2942 ,17	3	23,19	27,41	$3d \ ^1D^{\circ} - 5f \ F \ (3^1/2)$	2—3
2928 ,655	3	23,19	27,43	$3d \ ^1D^{\circ} - 5f \ G \ (3^1/2)$	2—3
2923 ,050 2922 ,76 2917 ,734 2904 ,357 2899 ,086	1 1 1 1	23,19 23,19 23,19 23,14 23,13	27 ,44 27 ,44 27 ,45 27 ,41 27 ,41	$3d ^{1}D^{\circ} - 5f D (2^{1}/_{2})$ $3d ^{1}D^{\circ} - 5f D (2^{1}/_{2})$ $3d ^{1}D^{\circ} - 5f D (1^{1}/_{2})$ $3d ^{3}F^{\circ} - 5f F (3^{1}/_{2})$ $3d ^{3}F^{\circ} - 5f F (2^{1}/_{2})$	2—3 2—2 2—2 4—4 3—3
2897,503	4	23 ,13	27,41	$3d\ ^3F^{\circ}$ —5 $f\ F\ (3^1/_2)$	3-4
2893,889	1	23 ,12	27,41	$3d\ ^3F^{\circ}$ —5 $f\ F\ (2^1/_2)$	2-2
2892,868	4	23 ,12	27,41	$3d\ ^3F^{\circ}$ —5 $f\ F\ (3^1/_2)$	2-3
2891,046	3	23 ,14	27,43	$3d\ ^3F^{\circ}$ —5 $f\ G\ (3^1/_2)$	4-4
2885,273	6	23 ,14	27,44	$3d\ ^3F^{\circ}$ —5 $f\ G\ (4^1/_2)$	4-5
2884 ,685	$\begin{array}{c} 2 \\ 4 \\ 4 \\ 4 \\ 0 \end{array}$	23,13	27 ,43	3d ³ F°-5f G (3 ¹ / ₂)	3—3
2884 ,246		23,13	27 ,43	3d ³ F°-5f G (3 ¹ / ₂)	3—4
2879 ,751		23,12	27 ,43	3d ³ F°-5f G (3 ¹ / ₂)	2—3
2877 ,681		23,13	27 ,44	3d ³ F°-5f G (4 ¹ / ₂)	3—4
2830 ,36		30,13	34 ,52	3d ⁵ E-5f ⁵ G°	4—5
2829 ,358 2823 ,635 2799 ,216 2734 ,702 2731 ,37	1 5 5 2 1	$30,13 \\ 20,67 \\ 21,60 \\ \{ \begin{array}{c} 22,10 \\ 23,57 \\ 23,57 \end{array} $	34,52 25,06 26,03 26,63 28,10 28,10	$\begin{array}{c} 3d \ ^{5}F-5f \ ^{5}G^{\circ} \\ 2p^{3} \ ^{1}P^{\circ}-4p \ ^{1}P \\ 3p \ ^{1}D-4d \ ^{1}D^{\circ} \\ 3p \ ^{1}S-5s \ ^{1}P^{\circ} \\ 3d \ ^{1}P^{\circ}-6f \ D \ (2^{1}/_{2}) \\ 3d \ ^{1}P^{\circ}-6f \ D \ (1^{1}/_{2}) \end{array}$	5-6 1-1 2-2 0-1 1-2 1-2
2709 ,837	6	21,60	26,17	$3p ^{1}D - 4d ^{1}F^{\circ}$	2-3
2690 ,49	1	23,47	28,08	$3d ^{1}F^{\circ} - 6f F (3^{1}/2)$	3-4
2679 ,60	1	23,47	28,09	$3d ^{1}F^{\circ} - 6f G (3^{1}/2)$	3-4
2675 ,78	2	23,47	28,10	$3d ^{1}F^{\circ} - 6f G (4^{1}/2)$	3-4
2646 ,87	0	23,47	28,10	$3d ^{3}P^{\circ} - 6f D (2^{1}/2)$	1-2
2646,02	0	23,42	28,10	$3d^{3}P^{\circ}$ — $6f D (1^{1}/_{2})$	0-1 $1-2$ $2-3$ $1-2$ $3-4$
2643,93	1	23,42	28,10	$3d^{3}P^{\circ}$ — $6f D (1^{1}/_{2})$	
2643,413	2	23,41	28,10	$3d^{3}P^{\circ}$ — $6f D (2^{1}/_{2})$	
2590,938	5	20,67	25,46	$2p^{3}^{1}P^{\circ}$ — $4p^{1}D$	
2563,319	3	23,24	28,08	$3d^{3}D^{\circ}$ — $6f F (3^{1}/_{2})$	
2561 ,943	2	23 ,24	28 ,08	$3d \ ^3D^{\circ}-6f \ F \ (2^{1}/_{2})$	2—3
2561 ,545	1	23 ,24	28 ,08	$3d \ ^3D^{\circ}-6f \ F \ (3^{1}/_{2})$	2—3

λ, Α	I	$E_{ m H}$. eV	E _B , eV	Transition	J
2560 ,243	3	23 ,24	28 ,08	$3d ^3D^{\circ}$ — $6f F (2^{1}/_{2})$	1-2
2558 ,62	0	21 ,16	26 ,00	$3p ^3P$ — $4d ^3F^{\circ}$	2-3
2553 ,422	4	23 ,24	28 ,09	$3d ^3D^{\circ}$ — $6f G (3^{1}/_{2})$	3-4
2551,64	$\begin{array}{c} 2 \\ 3 \\ 0 \\ 2 \\ 0 \end{array}$	23,24	28,09	$3d ^3D^{\circ}$ — $6f G (3^{1}/_{2})$	2-3
2537,873		23,19	28,08	$3d ^1D^{\circ}$ — $6f F (2^{1}/_{2})$	2-3
2537,49		23,19	28,08	$3d ^1D^{\circ}$ — $6f F (3^{1}/_{2})$	2-3
2527,762		23,19	28,09	$3d ^1D^{\circ}$ — $6f G (3^{1}/_{2})$	2-3
2526,17		21,16	26,06	$3p ^3P$ — $4d ^3D^{\circ}$	2-1
2525,48	0	23,19	28 ,10	$3d ^{1}D^{\circ}-6f D (2^{1}/_{2})$	2-3
2524,488	4	21,16	26 ,06	$3p ^{3}P-4d ^{3}D^{\circ}$	2-2
2522,458	4	21,15	26 ,06	$3p ^{3}P-4d ^{3}D^{\circ}$	1-1
2522,227	7	21,16	26 ,07	$3p ^{3}P-4d ^{3}D^{\circ}$	2-3
2520,791	6	21,15	26 ,06	$3p ^{3}P-4d ^{3}D^{\circ}$	1-2
2520,222	5	21,15	26,06	3p 3P-4d 3D°	0-1
2504,188	4	23,13	28,08	3d 3F°-6f F (3 ¹ / ₂)	3-4
2500,672	4	23,12	28,08	3d 3F°-6f F (3 ¹ / ₂)	2-3
2499,825	2	23,14	28,09	3d 3F°-6f G (4 ¹ / ₂)	4-4
2496,97	4	23,14	28,10	3d 3F°-6f G (4 ¹ / ₂)	4-5
2496 ,83	5	21,16	26,12	$3p^{3}P-4d^{3}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 3-3 \\ 3-4 \\ 2-1 \\ 1-2 \end{array} $
2494 ,92	0	23,13	28,09	$3d^{3}F^{\circ}-6f G (3^{1}/2)$	
2494 ,71	3	23,13	28,09	$3d^{3}F^{\circ}-6f G (3^{1}/2)$	
2493 ,940	3	21,16	26,13	$3p^{3}P-4d^{3}P^{\circ}$	
2493 ,16	2	21,15	26,12	$3p^{3}P-4d^{3}P^{\circ}$	
2491 ,46 2491 ,21 2490 ,281 2488 ,746 2488 ,120	3 4 3 2	$23,13 \\ 23,12 \\ 21,15 \\ 20,67 \\ 21,15 \\ 21,15$	28,40 28,09 26,43 25,58 26,43 26,43	$3d\ ^3F^{\circ}-6f\ G\ (4^{1}/_{2})$ $3d\ ^3F^{\circ}-6f\ G\ (3^{1}/_{2})$ $3p\ ^3P-4d\ ^3P^{\circ}$ $2p\ ^3P^{\circ}-4p\ ^1S$ $3p\ ^3P-4d\ ^3P^{\circ}$ $3p\ ^3P-4d\ ^3P^{\circ}$	3-4 2-3 1-1 1-0 1-0 0-1
2461,83	0	23,47	28,51	$\begin{array}{c} 3d {}^{1}F^{\circ} - 7f G (4^{1}/_{2}) \\ 3p {}^{1}D - 5s {}^{1}P^{\circ} \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \\ 3p {}^{3}S - 4d {}^{3}P^{\circ} \end{array}$	3-4
2461,270	6	21,60	26,63		2-1
2390,866	4	20,94	26,42		1-2
2388,230	3	20,94	26,43		1-1
2386,78	1	20,94	26,43		1-0
2364 ,04 2356 ,90 2330 ,855 2326 ,340 2325 ,16	${0 \atop 0} \atop {2 \atop 3} \atop {0}$	23,24 23,24 — 22,10 20,66	28,48 28,50 27,43 25,99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 3-4 - 0-1 3-2
2321,650	4	20,66	26,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3
2319,941	4	20,65	25,99		2-2
2317,046	8	20,66	26,01		3-4
2316,690	6	20,64	25,99		1-2
2316,493	7	20,65	26,00		2-3
2315,25	0	23,13	28,48	$3d \ ^3F^{\circ} - 7f \ F \ (3^{1}/_{2})$ $3d \ ^3F^{\circ} - 7f \ F \ (3^{1}/_{2})$ $3d \ ^3F^{\circ} - 7f \ G \ (4^{1}/_{2})$ $3p \ ^3P - 5s \ ^3P^{\circ}$ $3p \ ^3P - 5s \ ^3P^{\circ}$	3-4
2312,13	0	23,12	28,48		2-3
2309,53	1	23,14	28,51		4-5
2293,318	4	21,16	26,56		2-1
2292,652	3	21,15	26,56		1-0
2291 ,652 2290 ,259 2289 ,84 2288 ,444	4 3 0 5	$ \begin{array}{c} 20,66 \\ 21,15 \\ 20,65 \\ 20,65 \\ 21,45 \end{array} $	26,07 26,56 26,06 26,06 26,56	$3p \ ^3D - 4d \ ^3D^{\circ}$ $3p \ ^3P - 5s \ ^3P^{\circ}$ $3p \ ^3D - 4d \ ^3D^{\circ}$ $3p \ ^3D - 4d \ ^3D^{\circ}$ $3p \ ^3P - 5s \ ^3P^{\circ}$	3-3 1-1 2-1 2-2 0-1
2286,689 2283,652 2238,974 2235,208	6 { 4 4 4	21,46 20,64 21,45 20,67 20,67	26,58 26,06 26,58 26,21 26,22	$3p^{-3}P - 5s^{-3}P^{\circ}$ $3p^{-3}D - 4d^{-3}D^{\circ}$ $3p^{-3}P - 5s^{-3}P^{\circ}$ $2p^{3}P^{\circ} - 4fD(2^{1}/2)$ $2p^{3}P^{\circ} - 4fD(4^{1}/2)$	1-1 2-2 1-1 1-2 1-2 1-2

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λ, λ	I	E _H , eV	E _B , eV	Transition	J
2218,41 2206,088	0 6	20,41 20,41	25,99 26,03	3p ¹ P-4d ³ F° 3p ¹ P-4d ¹ D°	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
2203,633 2197,506	3 4	20 ,94 20 ,94	26,56 26,58	3p 3S—5s 3P° 3p 3S—5s 3P°	1—1 1—2
2189 ,78 2159 ,927 2142 ,775	$\begin{matrix} 2\\3\\6\end{matrix}$	21,60 0,02	27,33 5,80	$\begin{array}{c} - \\ 3p ^1D - 5d ^1D^{\circ} \\ 2p^2 ^3P - 2p^3 ^5S^{\circ} \end{array}$	$\begin{array}{c} - \\ 2-2 \\ 2-2 \end{array}$
2139,007 2130,179 2096,856 2096,192 2095,532	4 5 5 4 6	0,01 21,60 20,65 20,64 20,66	5,80 27,42 26,56 26,56 26,58	$2p^2 ^3P - 2p^3 ^5S^9 \ 3p ^1D - 5d ^1F^9 \ 3p ^3D - 5s ^3P^9 \ 3p ^3D - 5s ^3P^9 \ 3p ^3D - 5s ^3P^9$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-1 \\ 1-0 \\ 3-2 \end{array} $
2094,183 2091,316 2079,968 2076,944 1991,64	3 3 4 —	20,64 20,65 19,23 19,23 20,41	26,56 26,58 25,19 25,20 26,63	$\begin{array}{c} 3p\ ^3D-5s\ ^3P^{\circ} \\ 3p\ ^3D-5s\ ^3P^{\circ} \\ 2p^3\ ^3S^{\circ}-4p\ ^3P \\ 2p^3\ ^3S^{\circ}-4p\ ^3P \\ 3p\ ^1P-5s\ ^1P^{\circ} \end{array}$	1—1 2—2 1—1 1—2 1—1
1887,45 1878,60 1868,21 1862,57 1859,22	4 2 0 2 5	18,50 18,46 18,50 18,47 18,47	25,06 25,06 25,13 25,14 25,15	$3s ^{1}P^{\circ} - 4p ^{1}P$ $3s ^{3}P^{\circ} - 4p ^{1}P$ $3s ^{1}P^{\circ} - 4p ^{3}D$ $3s ^{3}P^{\circ} - 4p ^{3}D$ $3s ^{3}P^{\circ} - 4p ^{3}D$	1—1 1—1 1—1 2—2 2—3
1858,47 1857,77 1849,41 1848,1 1845,7	2 3 1 0	18,46 18,46 18,50 18,47 18,47	25,13 25,14 25,20 25,19 25,20	$3s ^3P^{\circ} - 4p ^3D$ $3s ^3P^{\circ} - 4p ^3D$ $3s ^1P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3P$	0-1 1-2 1-2 2-1 2-2
1844, 1843,4 1842,5 1841,14 1836,3 6	10 0 1 - 1	18,46 18,46 18,46 18,46 18,47	25, 19 25, 19 25, 19 25, 20 25, 23	$3s ^3P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3P$ $3s ^3P^{\circ} - 4p ^3S$	1-0 1-1 0-1 1-2 2-1
1831,78 1830,458 1766,08 1765,13 1763,63	5 4 1 1 2	18,46 18,46 19,23 19,23 19,23	25,23 25,23 26,25 26,25 26,26	$3s ^3P^{\circ} - 4p ^3S$ $3s ^3P^{\circ} - 4p ^3S$ $2p^3 ^3S^{\circ} - 3s ^3P$ $2p^3 ^3S^{\circ} - 3s ^3P$ $2p^3 ^3S^{\circ} - 3s ^3P$	i-1 0-1 1-0 1-1 1-2
1743,197 1740,309 1675,920 1675,744 1629,830	4	13,54 13,54 13,54 13,54 13,54	20,64 20,66 20,94 20,94 21,15	$2p^3 \ ^3P^{\circ} - 3p \ ^3D$ $2p^3 \ ^3P^{\circ} - 3p \ ^3D$ $2p^3 \ ^3P^{\circ} - 3p \ ^3S$ $2p^3 \ ^3P^{\circ} - 3p \ ^3S$ $2p^3 \ ^3P^{\circ} - 3p \ ^3P$	1, 2—2 2—3 0—1 1, 2—1 1—0
1629,02 1627,42 1616,06 1590,25 1573,21	1 1 1 2 1	13,54 13,54 — — —	21,15 21,16 — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0, 1, 2—1 1, 2—2 — — —
1346 ,44 1345 ,330 1343 ,338 1330 ,816 1276 ,800	$\frac{3}{3}$	11,44 11,44 11,43 — 11,44	20,64 20,64 20,66 — 21,15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1, 2—1 1, 2—2 3—3 — 1—0
1276,206 1275,247 1275,038 1258,75 1085,701	1 3 4 3	11,44 11,44 11,43 — 0,02	21,15 21,16 21,16 — 11,43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1, 2—1 1, 2—2 3—2 — 2—3

λ, Λ	I	$E_{ m H}$, eV	E_{B} , eV	Transition	J
1085,542 1084,572 1083,990 916,700 916,004	9 11 10 12 11	0,02 0,01 0,00 0,02 0,01	11,44 11,44 11,44 13,54 13,54	$2p^2 \ ^3P - 2p^3 \ ^3D^\circ \ 2p^2 \ ^3P - 2p^3 \ ^3D^\circ \ 2p^2 \ ^3P - 2p^3 \ ^3D^\circ \ 2p^2 \ ^3P - 2p^3 \ ^3P^\circ \ 2p^2 \ ^3P - 2p^3 \ ^3P^\circ$	2-2, 1 1-1, 2 0-1 2-1, 2 1-1, 2
915,955 915,603 860,205 858,374 836,837	10 10 0 1 1	0,01 0,00 4,05 4,05 11,44	13,54 13,54 18,46 18,50 26,25	$2p^2 \ ^3P - 2p^3 \ ^3P^\circ \ 2p^2 \ ^3P - 2p^3 \ ^3P^\circ \ 2p^2 \ ^1S - 3s \ ^3P^\circ \ 2p^2 \ ^1S - 3s \ ^1P^\circ \ 2p^3 \ ^3D^\circ - 3s \ ^3P$	10 0-1 0-1 0-1 1, 2-0
836,618 836,281 836,184 775,957 748,364	3 0 3 12 5	11,44 11,44 11,43 1,90 1,90	26,25 26,26 26,26 17,88 18,46	$2p^3 ^3D^{\circ} - 3s ^3P$ $2p^3 ^3D^{\circ} - 3s ^3P$ $2p^3 ^3D^{\circ} - 3s ^3P$ $2p^2 ^1D - 2p^3 ^1D^{\circ}$ $2p^2 ^1D - 3s ^3P^{\circ}$	$\begin{array}{c} 1, \ 2-1 \\ 1, \ 2-2 \\ 3-2 \\ 2-2 \\ 2-1 \end{array}$
746,976 745,836 671,999 671,770 671,629	7 6 6 6 6	1,90 4,05 0,02 0,01 0,01	18,50 20,67 18,46 18,46 18,46	$2p^{2} ^{1}D - 3s ^{1}P^{\circ} \ 2p^{2} ^{1}S - 2p^{3} ^{1}P^{\circ} \ 2p^{2} ^{3}P - 3s ^{3}P^{\circ} \ 2p^{2} ^{3}P - 3s ^{3}P^{\circ} \ 2p^{2} ^{3}P - 3s ^{3}P^{\circ}$	2-1 0-1 2-J 1-0 1-1
671,391 671,014 670,881 670,508 670,289	8 6 1 1 2	0,01 0,01 0,02 0,01 0,00	18,47 18,47 18,50 18,50 18,50	$2p^2$ 3P $- 3s$ $^3P^\circ$ $2p^2$ 3P $- 3s$ $^3P^\circ$ $2p^2$ 3P $- 3s$ $^1P^\circ$ $2p^2$ 3P $- 3s$ $^1P^\circ$ $2p^2$ 3P $- 3s$ $^1P^\circ$	$ \left\{ \begin{array}{l} 2-2\\ 0-1\\ 1-2\\ 2-1\\ 1-1\\ 0-1 \end{array} \right. $
660,280 657,327 645,167 644,825 644,621	9 1 10 9 8	1,90 0,02 0,01 0,00	20,67 	$2p^{2} {}^{1}D - 2p^{3} {}^{1}P^{\circ}$ $ 2p^{2} {}^{3}P - 2p^{3} {}^{3}S^{\circ}$ $2p^{2} {}^{3}P - 2p^{3} {}^{3}S^{\circ}$ $2p^{2} {}^{3}P - 2p^{3} {}^{3}S^{\circ}$	$ \begin{array}{c} 2-1 \\ -1 \\ 2-1 \\ 1-1 \\ 0-1 \end{array} $
635,180 629,434 629,161 582,150 574,650	5 2 3 5 6	4,05 5,80 5,80 1,90 1,90	23,57 25,50 25,51 23,19 23,47	$2p^{2} {}^{1}S - 3d {}^{1}P^{\circ}$ $2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$ $2p^{2} {}^{1}D - 3d {}^{1}D^{\circ}$ $2p^{2} {}^{1}D - 3d {}^{1}F^{\circ}$	0-1 $2-2$ $2-3$ $2-2$ $2-3$
559,760 547,813 533,809 533,726 533,644	0 0 4 6 4	4,05 1,90 0,02 0,02 0,01	26,20 24,53 23,24 23,24 23,24	$2p^{2} {}^{1}S - 4d {}^{1}P^{\circ}$ $2p^{2} {}^{1}D - 4s {}^{1}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$	0-1 $2-1$ $2-2$ $2-3$ $1-1$
533,577 533,504 529,860 529,713 529,627	5 4 5 3 3	0,01 0,00 0,02 0,02 0,01	23,24 23,24 23,41 23,41 23,41	$2p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-2 \\ 2-1 \\ 1-2 \end{array} $
529,481 529,405 529,343 513,845 510,757	3 3 2 3	0,01 0,01 0,00 1,90 1,90	23,42 23,42 23,42 26,03 26,17	$2p^2 ^3P - 3d ^3P^{\circ}$ $2p^2 ^3P - 3d ^3P^{\circ}$ $2p^2 ^3P - 3d ^3P^{\circ}$ $2p^2 ^1D - 4d ^1D^{\circ}$ $2p^2 ^1D - 4d ^1F^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 1 - 0 \\ 0 - 1 \\ 2 - 2 \\ 2 - 3 \end{array} $
509,018 508,903 508,700 508,459 506,160	0 0 2 0 3	0,02 0,01 0,02 0,01 5,80	24,37 24,37 24,39 24,39 30,29	$2p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $2p^{3} ^{5}S^{\circ} - 3d ^{5}P$	$ \begin{array}{c} 2-1 \\ 1-0 \\ 2-2 \\ 1-2 \\ 2-3 \end{array} $
506,057 505,985 485,857	2 1 0	5,80 5,80 1,90	30,29 30,30 27,42	$2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{2} {}^{1}D - 5d {}^{1}F^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-3 \end{array} $

λ, Å	I	$E_{ m H}$, eV E	B. eV	Transition	J
475,876 475,800	1 3		6,06 6,07	$\frac{2p^2}{2p^2} {}^{3}P - 4d {}^{3}D^{\circ} \\ 2p^2 {}^{3}P - 4d {}^{3}D^{\circ}$	$\begin{array}{c} 2-2 \\ 2-3 \end{array}$
475,697 475,638 474,883 474,774 474,698	2 1 2 0 0	$ \begin{array}{ccc} 0,00 & 2\\ 0,02 & 2\\ 0,02 & 2 \end{array} $	6,06 6,06 6,13 6,13 6,13	$2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 4d {}^{3}P^{\circ}$	1-2 $0-1$ $2-2$ $2-1$ $1-2$
474,601 474,540 474,493 453,340 453,257	0 0 0 1 0	$ \begin{array}{ccc} 0,01 & 2 \\ 0,00 & 2 \\ 0,02 & 2 \end{array} $	6,13 6,13 6,13 7,36 7,36	$2p^{2}$ ^{3}P — $4d$ $^{3}P^{\circ}$ $2p^{2}$ ^{3}P — $4d$ $^{3}P^{\circ}$ $2p^{2}$ ^{3}P — $4d$ $^{3}P^{\circ}$ $2p^{2}$ ^{3}P — $5d$ $^{3}D^{\circ}$ $2p^{2}$ ^{3}P — $5d$ $^{3}D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 1 - 0 \\ 0 - 1 \\ 2 - 3 \\ 1 - 2 \end{array} $

N III, ground state $1s^2 \, 2s^2 \, 2p^{\, 2} P_{1/2}^0$ Ionization potential 382625,5 cm⁻¹; 47,436 eV

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λ, Α	I	E _H , eV	E _B , eV	Transition	J
6487,55 6478,69 6468,77 6466,86 6463,03	$\begin{array}{c} 0 \\ 2 \\ 00 \\ 4 \\ 2 \end{array}$	39,35 39,35 39,34 39,35 39,34	41,26 41,26 41,26 41,27 41,26	$3p {}^{4}P - 3d {}^{4}D^{\circ}$ $3p {}^{4}P - 3d {}^{4}D^{\circ}$ $3p {}^{4}P - 3d {}^{4}D^{\circ}$ $3p {}^{4}P - 3d {}^{4}D^{\circ}$ $3p {}^{4}P - 3d {}^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
6453,95	3	39,34	41,26	$3p ^4P - 3d ^4D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
6450,78	2	39,34	41,26	$3p ^4P - 3d ^4D^{\circ}$	
6445,05	2	39,34	41,26	$3p ^4P - 3d ^4D^{\circ}$	
5314,45	2	39,35	41,68	$3p ^4P - 3d ^4P^{\circ}$	
5298,93	1	39,35	41,69	$3p ^4P - 3d ^4P^{\circ}$	
5297,86	1	39,34	41,68	$3p ^4P - 3d ^4P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
5282,52	00	39,34	41,69	$3p ^4P - 3d ^4P^{\circ}$	
5272,60	1	39,34	41,69	$3p ^4P - 3d ^4P^{\circ}$	
5270,59	1	39,34	41,69	$3p ^4P - 3d ^4P^{\circ}$	
5260,91	1	39,34	41,69	$3p ^4P - 3d ^4P^{\circ}$	
4896 ,71 4884 ,14 4881 ,81 4873 ,58 4867 ,18	0 1 0 2 5	38,40 38,40 38,40 38,40 (38,40 (38,39	40,94 40,95 40,94 40,94 40,96 40,94	$3p ^4D - 3d ^4F^{\circ}$ $3p ^4D - 3d ^4F^{\circ}$	7/2 - 5/2 $7/2 - 7/2$ $5/2 - 3/2$ $5/2 - 5/2$ $7/2 - 5/2$ $3/2 - 3/2$
4861,33	4	38,40	40,95	$3p ^4D - 3d ^4F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4858,88	3	38,39	40,94	$3p ^4D - 3d ^4F^{\circ}$	
4858,74	2	38,39	40,94	$3p ^4D - 3d ^4F^{\circ}$	
4641,90	7	30,46	33,13	$3p ^2P^{\circ} - 3d ^2D$	
4640,64	10	30,46	33,13	$3p ^2P^{\circ} - 3d ^2D$	
4634,16	8	30,46	33,13	$3p^{2}P^{\circ}-3d^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
4547,34	0	35,67	38,39	$3s^{4}P^{\circ}-3p^{4}D$	
4546,36	3	38,96	41,68	$3p^{4}S-3d^{4}P^{\circ}$	
4544,80	0	38,64	41,37	$4p^{2}P^{\circ}-5s^{2}S$	
4535,11	2	38,96	41,69	$3p^{4}S-3d^{4}P^{\circ}$	
4534,57	3	35,67	38,40	3s ⁴ P°-3p ⁴ D	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 2 - 3/2 \\ 1/2 - 1/2 \end{array} $
4530,84	1	35,66	38,39	3s ⁴ P°-3p ⁴ D	
4527,86	0	38,96	41,69	3p ⁴ S-3d ⁴ P°	
4523,60	4	35,66	38,39	3s ⁴ P°-3p ⁴ D	
4518,18	3	35,65	38,39	3s ⁴ P°-3p ⁴ D	

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4514,89 4510,92 4379,09 4353,66 4348,36	7 6 10 2 5	35,67 { 35,66 35,65 39,71 38,40 38,40	38,40 38,40 38,39 42,54 41,26 41,27	$3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $3s ^4P^{\circ} - 3p ^4D$ $4f ^2F^{\circ} - 5g ^2G$ $3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2, 7/2 - 7/2, 9/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \end{array}$
4339,52 4335,53 4330,44 4330,14 4328,15	3 4 2 2 2 3	38,40 38,40 38,39 38,40 38,39	41,26 41,26 41,26 41,26 41,27 41,26	$3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
4323,93 4321,37 4294,76 4290,80	2 1 0 3	38,39 38,39 —	41,26 41,26 —	$3p ^4D - 3d ^4D^{\circ}$ $3p ^4D - 3d ^4D^{\circ}$ $-$	$ \begin{cases} \frac{1}{2} - \frac{1}{2} \\ \frac{3}{2} - \frac{5}{2} \\ \frac{1}{2} - \frac{3}{2} \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
4290,55 4288,72 4288,21 4284,51	1 1 0 1	- - -	_ _ _	_ _ _	_ _ _ _
4215,69 4200,02 4195,70 4103,37	3 6 5 9	36,85 36,85 36,84 27,44	39,79 39,80 39,79 30,46	$3s {}^{2}P^{\circ} - 3p {}^{2}D$ $3s {}^{2}P^{\circ} - 3p {}^{2}D$ $3s {}^{2}P^{\circ} - 3p {}^{2}D$ $3s {}^{2}S - 3p {}^{2}P^{\circ}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $
4097,31 4003,64 3998,69 3942,78	10 4 3 1	27,44 39,40 39,39 38,33	30,46 42,50 42,50 41,47	$3s^{2}S - 3p^{2}P^{\circ}$ $4d^{2}D - 5f^{2}F^{\circ}$ $4d^{2}D - 5f^{2}F^{\circ}$ $4d^{2}D - 5f^{2}F^{\circ}$ $3p^{2}P - 3d^{2}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3938,52 3934,41 3792,87 3779,23	4 3 1 —	38,33 38,32 38,40 38,40	41,48 41,48 41,68 41,68	$3p^{2}P - 3d^{2}D^{\circ}$ $3p^{2}P - 3d^{2}D^{\circ}$ $3p^{4}D - 3d^{4}P^{\circ}$ $3p^{4}D - 3d^{4}P^{\circ}$	3/2 - 5/2 $1/2 - 3/2$ $7/2 - 5/2$ $5/2 - 5/2$
3771 ,45 3771 ,08 3770 ,37 3762 ,62 3757 ,66	2 7 — —	38,40 35,67 38,39 38,39 38,39	41,69 38,96 41,68 41,69 41,69	$3p ^4D - 3d ^4P^{\circ}$ $3s ^4P^{\circ} - 3p ^4S$ $3p ^4D - 3d ^4P^{\circ}$ $3p ^4D - 3d ^4P^{\circ}$ $3p ^4D - 3d ^4P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3757,60 3754,62 3752,65 3745,83 3374,06	-6 3 4 6	38,39 35,66 38,39 35,65 35,67	41,69 38,96 41,69 38,96 39,34	$3p ^4D - 3d ^4P^{\circ}$ $3s ^4P^{\circ} - 3p ^4S$ $3p ^4D - 3d ^4P^{\circ}$ $3s ^4P^{\circ} - 3p ^4S$ $3s ^4P^{\circ} - 3p ^4P$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 1/_2 - 3/_2 \\ 5/_2 - 3/_2 \end{array} $
3367,36 3365,79 3361,90 3358,72 3355,47	7 3 2 1 2	35,67 35,66 35,66 35,65 36,85	39,35 39,34 39,34 39,34 40,55	$3s ^4P^{\circ} - 3p ^4P$ $3s ^2P^{\circ} - 3p ^2S$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
3354 ,29 3353 ,78 3342 ,77 3172 ,97 3171 ,14	4 4 1 2 1	35,66 35,65 36,84 —	39,35 39,34 40,55 —	3s ⁴ P°—3p ⁴ P 3s ⁴ P°—3p ⁴ P 3s ² P°—3p ² S —	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ - \end{array} $
2983,58 2982,07 2978,87 2977,32 2972,60	6 1 3 3 4	38,33 38,33 38,33 38,32	42,49 42,49 42,50 42,50	$3p ^{2}P - 3d ^{2}P^{\circ}$ $- \\ 3p ^{2}P - 3d ^{2}P^{\circ}$ $3p ^{2}P - 3d ^{2}P^{\circ}$ $3p ^{2}P - 3d ^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2862,26 2714,35	6 1	39,71 28,56	44,04 33,13	$\frac{4f ^2F^{\circ} - 6g ^2G}{2p^3 ^2P^{\circ} - 3d ^2D}$	$\frac{7}{2}$, $\frac{9}{2}$, $\frac{7}{2}$, $\frac{9}{2}$

λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
2714,08 2713,95 2696,64	3 5 1	28,56 28,56	33,13 33,13 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1/_{2}-^{3/_{2}}}_{^{3/_{2}-^{5/_{2}}}}$
2696,19 2689,26 2687,01 2622,85 2621,19	2 4 3 2 1	39,40 39,39 42,13 42,12	 44,01 44,01 46,86 46,85	$\begin{array}{c} - \\ 4d\ ^2D - 6f\ ^2F^{\circ} \\ 4d\ ^2D - 6f\ ^2F^{\circ} \\ 3d\ ^2F^{\circ} - 4p\ ^2D \\ 3d\ ^2F^{\circ} - 4p\ ^2D \end{array}$	$ \begin{array}{c}$
2486,49 2484,56 2482,85 2471,24 2468,36	3 4 1 00 0	41,47 41,48 41,47 41,69 41,69	46,46 46,47 46,47 46,71 46,71	$3d ^{2}D^{\circ}-4p ^{2}P$ $3d ^{2}D^{\circ}-4p ^{2}P$ $3d ^{2}D^{\circ}-4p ^{2}P$ $3d ^{4}P^{\circ}-4p ^{4}D$ $3d ^{4}P^{\circ}-4p ^{4}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2466,24 2463,04 2462,56 2459,26 2453,85	1 00 1 0 4	41,69 41,68 41,69 41,68 41,68	46,71 46,71 46,72 46,72 46,73	$3d ^4P^{\circ}-4p ^4D$ $3d ^4P^{\circ}-4p ^4D$ $3d ^4P^{\circ}-4p ^4D$ $3d ^4P^{\circ}-4p ^4D$ $3d ^4P^{\circ}-4p ^4D$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
2372,46 2370,49 2367,43 2322,81 2322,23	2 3 4 1 0	41,69 41,69 41,68 41,69 41,69	46,92 46,92 46,92 47,02 47,03	3d ⁴ P°—4p ⁴ S 3d ⁴ P°—4p ⁴ S 3d ⁴ P°—4p ⁴ S 3d ⁴ P°—4p ⁴ P 3d ⁴ P°—4p ⁴ P	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2320,33 2317,35 2314,56 2274,12 2273,51	00 0 1 0 1	41,69 41,68 41,69 41,69 41,26 41,26	47,03 47,03 47,04 47,02 46,71 46,71	$3d ^4P^{\circ}-4p ^4P$ $3d ^4P^{\circ}-4p ^4P$ $3d ^4P^{\circ}-4p ^4P$ $3d ^4P^{\circ}-4p ^4P$ $3d ^4P^{\circ}-4p ^4D$ $3d ^4D^{\circ}-4p ^4D$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
2272,42 2271,79 2270,43 2269,30 2267,28	0 0 2 0 3	41,26 41,26 41,26 41,26 41,26 41,26 41,27	46,71 46,72 46,71 46,72 46,72 46,72	$3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$ $3d\ ^4D^{\circ}-4p\ ^4D$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
2265 ,87 2248 ,88 2247 ,92 2247 ,65 2237 ,21	0 5 6 2	41,26 33,13 33,13 33,13 36,85	46,73 38,64 38,64 38,64 42,39	$3d ^4D^{\circ} - 4p ^4D$ $3d ^2D - 4p ^2P^{\circ}$ $3s ^2P^{\circ} - 5d ^2D$	$ \frac{5}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $
2231,65 2192,52 2191,39 2188,52 2188,27	1 3 3 5	36,84 42,50 42,49 42,50 42,49	42,39 48,15 48,14 48,16 48,15	$3s ^3P^{\circ} - 5d ^2D$ $3d ^2P^{\circ} - 4f ^4D$ $3d ^2P^{\circ} - 4f ^4D$ $3d ^2P^{\circ} - 4f ^2D$ $3d ^2P^{\circ} - 4f ^2D$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2185,13 2151,61 2149,96 2148,99 2148,47	1 0 0 1 3	42,49 41,26 40,94 41,26 40,94	48,16 — 47,02 46,71 47,03 46,71	$3d\ ^{2}P^{\circ}-4f\ ^{2}D$ $ 3d\ ^{4}D^{\circ}-4p\ ^{4}P$ $3d\ ^{4}F^{\circ}-4p\ ^{4}D$ $3d\ ^{4}D^{\circ}-4p\ ^{4}P$ $3d\ ^{4}F^{\circ}-4p\ ^{4}D$	$ \begin{array}{c} 3/2 - 3/2 \\ - \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2148,09 2147,79 2147,27 2146,59 2145,74	3 2 4 00 1	40,95 41,27 40,96 41,26 40,94	46,72 47,04 46,73 47,04 46,72	3d ⁴ F°-4p ⁴ D 3d ⁴ D°-4p ⁴ P 3d ⁴ F°-4p ⁴ D 3d ⁴ D°-4p ⁴ P 3d ⁴ F°-4p ⁴ D	7/2-5/2 $7/2-5/2$ $9/2-7/2$ $5/2-3/2$ $5/2-5/2$
2143,96 2142,67	0	40,95 —	46,73 —	3d ⁴ F°—4p ⁴ D —	⁷ / ₂ — ⁷ / ₂ —

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λ, Λ	I	E _H , eV	E _B , eV	Transition	J
2079 ,86 2074 ,74 2072 ,86	6 2 1	42,13 42,13	 48,11 48,11	 3d ² F°-4f ⁴ G 3d ² F°-4f ⁴ G	$\frac{-}{7/2}$
2071,79 2070,63 2068,25 2063,99 2063,50	2 5 6 10 10	42 ,13 42 ,13 42 ,13 42 ,12	48,12 48,12 48,13 48,13	3d ² F°—4f ⁴ G 3d ² F°—4f ² G 3d ² F°—4f ² G 3d ² F°—4f ² G 3d ² F°—4f ² G	$ \begin{array}{c}$
2035,62 2035,02 1953,80 1953,66 1952,20	2 3 3 3 1	 39,34 39,35 39,34	45,69 45,70 45,69	 3p ⁴ P-4s ⁴ P° 3p ⁴ P-4s ⁴ P° 3p ⁴ P-4s ⁴ P°	$ \begin{array}{c} $
1951,43 1949,81 1949,22 1946,99 1923,86	2 4 6 5 2	39,34 39,34 39,35 39,34	45,70 45,70 45,71 45,71	$3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ 3p ^4P - 4s ^4P^{\circ} \ -$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{5}{2} $
1923 ,11 1921 ,49 1920 ,86	2 4 8	41,69 { 41,69 41,68	48,14 48,15 48,14	3d ⁴ P°—4f ⁴ D 3d ⁴ P°—4f ⁴ D 3d ⁴ P°—4f ⁴ D	$ \begin{array}{r} $
1919,99 1919,71	$\frac{2}{2}$	41,69 41,69	48,15 48,15	3d ⁴ P°—4f ⁴ D 3d ⁴ P°—4f ⁴ D	$\frac{1}{3} \frac{2}{2} \frac{1}{2} \frac{1}{2}$
1919,44 1919,06 1918,69 1908,96	1 0 0 1	41,68 41,69 41,69 41,48	48,14 48,14 48,15 47,97	3d ⁴ P°-4f ⁴ D 3d ⁴ P°-4f ⁴ D 3d ⁴ P°-4f ⁴ D 3d ² D°-4f ² F	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
1908,11	7	41,47	47,98	$3d^{2}D^{\circ}$ — $4f^{2}F$	$\begin{cases} \frac{5}{2} - \frac{7}{2} \\ \frac{3}{2} - \frac{5}{2} \end{cases}$
1907,28 1906,89 1906,22 1885,25 1845,80	4 1 1 10 4	41,28 41,48 41,47 33,13 41,26	47,98 47,98 47,98 39,71 47,98	$3d^{2}D^{\circ}-4f^{4}F$ $3d^{2}D^{\circ}-4f^{4}F$ $3d^{2}D^{\circ}-4f^{4}F$ $3d^{2}D-4f^{2}F^{\circ}$ $3d^{4}D^{\circ}-4f^{4}F$	$ \begin{array}{c} 5 & -5 \\ 5 & -7 \\ 2 & -7 \\ 3 & -5 \\ 2 & -5 \\ 3 & -5 \\ 2 & -5 \\ 3 & -7 \\ 2 \end{array} $
1845,64 1841,68 1839,59 1835,587 1805,5	5 1 2 6 7	41,27 38,96 38,96 38,96 30,46	47,98 45,69 45,70 45,71 37,33	$3d ^4D^{\circ} - 4f ^4F$ $3p ^4S - 4s ^4P^{\circ}$ $3p ^4S - 4s ^4P^{\circ}$ $3p ^4S - 4s ^4P^{\circ}$ $3p ^2P^{\circ} - 4s ^2S$	7/2 - 9/2 $3/2 - 1/2$ $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 1/2$
1804,3 1751,75 1751,24 1747,86 1730,04	6 10 6 9 8	30,46 18,10 18,10 18,08 40,95	37,33 25,18 25,18 25,18 48,12	$3p^{2}P^{\circ}-4s^{2}S$ $2p^{2}^{2}P-2p^{3}^{2}D^{\circ}$ $2p^{2}^{2}P-2p^{3}^{2}D^{\circ}$ $2p^{2}^{2}P-2p^{3}^{2}D^{\circ}$ $3d^{4}F^{\circ}-4f^{4}G$	$\begin{array}{c} \frac{1}{3} \frac{1}{2} = \frac{1}{2} \\ \frac{3}{2} = \frac{5}{2} \\ \frac{3}{2} = \frac{3}{2} \\ \frac{1}{2} = \frac{3}{2} \\ \frac{7}{2} = \frac{9}{2} \end{array}$
1699,95	4	38,40	45,69	$3p$ 4D — $4s$ 4P $^\circ$	$\begin{cases} \frac{5}{2} - \frac{3}{2} \\ \frac{3}{2} - \frac{1}{2} \\ \frac{5}{2} \end{cases}$
1699,32 1699,00 1698,16 1697,19	5 2 2 0	38,40 38,39 38,39 38,39	45,71 45,69 45,70 45,70	$3p ^4D - 4s ^4P^{\circ} \ 3p ^4D - 4s ^4P^{\circ}$	7/2 - 3/2 $1/2 - 1/2$ $3/2 - 3/2$ $1/2 - 3/2$
1696,54 1694,79 1471,69 1471,02 1470,68	3 0 2 1 0	38,40 38,39 39,35 39,34 39,34	45,71 45,71 47,77 47,77 47,77	$3p ^4D - 4s ^4P^{\circ}$ $3p ^4D - 4s ^4P^{\circ}$ $3p ^4P - 4d ^4D^{\circ}$ $3p ^4P - 4d ^4D^{\circ}$ $3p ^4P - 4d ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
1387,31 1347,56	4 0	$\left\{\begin{array}{c} 30,46 \\ 30,46 \\ 38,40 \end{array}\right.$	39,39 39,39 47,61	$3p^{2}P^{\circ}-4d^{2}D$ $3p^{2}P^{\circ}-4d^{2}D$ $3p^{4}D-4d^{4}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$

				The second second	
λ, Å	I	E _H , eV	E _B , eV	Transition	J
1346 ,27 1345 ,69 1324 ,40	4 4 3	38,40 38,39 38,40	47,62 47,61 47,75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{7/2}_{2}$, $^{9/2}_{3/2}$, $^{5/2}_{7/2}$, $^{5/2}_{2}$
1184,544 1183,030 1006,015 991,579 991,514	8 7 6 17 14	18,10 18,08 16,24 0,02 0,02	28,56 28,56 28,56 12,52 12,52	$2p^{2} {}^{2}P - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}P - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}S - 2p^{3} {}^{2}P^{\circ} \ 2p {}^{2}P^{\circ} - 2p^{2} {}^{2}D \ 2p {}^{2}P^{\circ} - 2p^{2} {}^{2}D$	$\begin{array}{c} 3/2 - 1/2, & 3/2 \\ 1/2 - 1/2, & 3/2 \\ 1/2 - 1/2, & 3/2 \\ 1/2 - 1/2, & 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
989,790 979,919 979,842 871,850 772,975	16 9 8 0 8	0,00 12,52 12,52 16,24 12,52	12,52 25,18 25,18 30,46 28,56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
772,891 772,385 771,901 771,544 764,357	9 12 11 10 15	12,52 7,11 7,10 7,09 0,02	28,56 23,16 23,16 23,16 16,24	$2p^2 ^2D - 2p^3 ^2P^\circ \ 2p^2 ^4P - 2p^3 ^4S^\circ \ 2p^2 ^4P - 2p^3 ^4S^\circ \ 2p^2 ^4P - 2p^3 ^4S^\circ \ 2p ^2P - 2p^2 ^2S^\circ $	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
763,340 691,388 691,187 686,335 685,816	14 1 2 14 16	0,00 12,52 12,52 0,02 0,02	16,24 30,46 30,46 18,08 18,10	$2p^{2}P-2p^{2}^{2}S^{\circ}$ $2p^{2}^{2}D-3p^{2}P^{\circ}$ $2p^{2}^{2}D-3p^{2}P^{\circ}$ $2p^{2}^{2}P-2p^{2}^{2}P$ $2p^{2}P^{\circ}-2p^{2}^{2}P$ $2p^{2}P^{\circ}-2p^{2}^{2}P$	1/2 - 1/2 $3/2 - 1/2$ $5/2 - 3/2$ $3/2 - 1/2$ $3/2 - 3/2$
685,513 684,996 601,878 601,468 530,268	15 14 0 1 3	0,00 0,00 16,24 16,24 18,10	18,08 18,10 36,84 36,85 41,48	$2p \ ^{2}P^{\circ}-2p^{2} \ ^{2}P$ $2p \ ^{2}P^{\circ}-2p^{2} \ ^{2}P$ $2p^{2} \ ^{2}S-3s \ ^{2}P^{\circ}$ $2p^{2} \ ^{2}S-3s \ ^{2}P^{\circ}$ $2p^{2} \ ^{2}P-3d \ ^{2}D^{\circ}$	1/2 - 1/2 $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 5/2$
530,037 509,897 509,586 472,392 472,232	2 4 5 5 4	18,08 12,52 12,52 16,24 16,24	41,47 36,84 36,85 42,49 42,50	$2p^{2} {}^{2}P - 3d {}^{2}D^{\circ}$ $2p^{2} {}^{2}D - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}D - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
456,078 452,226 451,869 434,280 434,246	1 11 10 6 6	12,52 0,02 0,00 7,11 7,10	39,71 27,44 27,44 35,66 35,65	$2p^{2} {}^{2}D - 4f {}^{2}F^{\circ}$ $2p {}^{2}P^{\circ} - 3s {}^{2}S$ $2p {}^{2}P^{\circ} - 3s {}^{2}S$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
434,129 434,066 434,014 433,911 428,244	5 7 6 6 5	7,10 7,11 7,09 7,10 12,52	35,66 35,67 35,66 35,67 41,47	$2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{2}D - 3d {}^{2}D^{\circ}$	$ \left\{ \begin{array}{l} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} \right. $
428,180 418,910 418,705 413,797 413,681	6 6 7 0 0	12,52 12,52 12,52 12,52 12,52 12,52	41,48 42,12 42,13 42,49 42,50	$2p^2 \ ^2D - 3d \ ^2D^{\circ}$ $2p^2 \ ^2D - 3d \ ^2F^{\circ}$ $2p^2 \ ^2D - 3d \ ^2F^{\circ}$ $2p^2 \ ^2D - 3d \ ^2P^{\circ}$ $2p^2 \ ^2D - 3d \ ^2P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
399,084 399,045 398,885 374,441 374,31	1 4 3 12 1	18,10 18,10 18,08 0,02 0,02	49,17 49,17 49,17 33,13 33,13 33,13	$2p^{2} {}^{2}P - 3d' {}^{2}D^{\circ}$ $2p^{2} {}^{2}P - 3d' {}^{2}D^{\circ}$ $2p^{2} {}^{2}P - 3d' {}^{2}D^{\circ}$ $2p {}^{2}P^{\circ} - 3d {}^{2}D$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$ $1/2 - 3/2$
374,204 362,985 362,946 362,881 362,833	11 6 8 8 7	0,00 7,11 7,11 7,10 7,09	35,13 41,26 41,27 41,26 41,26	$2p^{2}P - 3a^{2}D$ $2p^{2}P - 3d^{4}D^{\circ}$ $2p^{2}P - 3d^{4}D^{\circ}$ $2p^{2}P - 3d^{4}D^{\circ}$ $2p^{2}P - 3d^{4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
358,578	6	7 ,11	41,68	$2p^2 ^4P - 3d ^4P^{\circ}$	⁵ / ₂ — ⁵ / ₂
358,509	$\overset{\circ}{5}$	7,11	41,69	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{5}{2} - \frac{3}{5} = \frac{3}{5}$
358,469	$\tilde{5}$	7,10	41,68	$2p^{2} ^{4}P - 3d ^{4}P^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
358,401	$\ddot{3}$	7 ,10	41,69	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{3}{2} - \frac{3}{2}$
358,356	5	7,10	41,69	$2p^2 ^4P - 3d ^4P^{\circ}$	3/2-1/2
	5	7,09	41,69	$2p^2 ^4P - 3d ^4P^{\circ}$	$^{1}/_{2}$ — $^{3}/_{2}$
358,327 358,278	3	7,09	41,69	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$^{1}/_{2}$ — $^{1}/_{2}$
351,979	1	12,52	47,75	$2p^{2} ^{2}D$ —4 $d ^{2}D^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$
348,800	0	12,52	48,07	$2p^2 ^2D - 4d ^2D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
348,690	ŏ	12,52	48,08	$2p^2 \ ^2D - 4d \ ^2D^{\circ}$	$\frac{5}{2}$ $-\frac{7}{2}$
338,345	2	12,52	49,17	$2p^2 ^2D$ —4 $d ^2D^{\circ}$	$\left\{\begin{array}{c} 5/2-5/2\\ 3/2-3/2 \end{array}\right.$
			37,33	$2p^{2}P^{\circ}-4s^{2}S$	$\frac{3}{2} - \frac{1}{2}$
332,327	3	0,02	37,33 37,33	$\frac{2p}{2p} {}^{2}P^{\circ} - 4s {}^{2}S$	$\frac{1}{2}$ $\frac{1}{2}$
332,133	2	0,00	38,32	$2p^{2}P^{\circ}-3p^{2}P$	$\frac{3}{2}$ _1/2
323,671	4	$\substack{0,02\\0,02}$	38,33	$2p^{2}P^{\circ}-3p^{2}P$	$\frac{3}{2}$ $\frac{3}{2}$
323,615	6			$2p^{2}P^{\circ}-3p^{2}P$	$^{1}/_{2}$ — $^{1}/_{2}$
323,488	5	0,00	$38,32 \\ 38,33$	$2p \cdot P - 3p \cdot P$ $2p \cdot 2P \circ -3p \cdot 2P$	$\frac{1}{2} - \frac{3}{2}$
323,431	4	0,00	•	<u> </u>	$\frac{3}{2}$ $\frac{1}{2}$
321,270	1	7,11	45,69	$2p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	(5/2-3/2)
321,161	2	7,11	45,71	$2p^{2} {}^{4}P - 4s {}^{4}P^{\circ} \\ 2p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
321,071	1	7,10	45,71		$\frac{72}{3/2}$ $\frac{72}{3/2}$
314,877	6	0,02	39,39	$\frac{2p}{2p} {}^{2}P^{\circ} - 4d {}^{2}D \\ 2p} {}^{2}P^{\circ} - 4d {}^{2}D$	$\frac{3}{2} - \frac{5}{2}$
314,850	9	0.02	39,40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
314,715	8	00,00	39,39	$2p \cdot P - 4u \cdot D$ $2p \cdot P \circ - 3p \cdot 2D$	$\frac{3}{2} - \frac{5}{2}$
311,628	3	0,02	39,80	$2p \stackrel{?}{\sim} P \stackrel{=}{\sim} 3p \stackrel{?}{\sim} D$ $2p \stackrel{?}{\sim} P \stackrel{\circ}{\sim} -3p \stackrel{?}{\sim} D$	$\frac{1}{2} \frac{72}{3} \frac{72}{2}$
311,539	2	0,00	39,79		$\frac{72}{3/2}$ $\frac{72}{1/2}$
305,918	1	0,02	40,55	$2p^{2}P^{\circ}-3p^{2}S$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
304,912	3	7,11	47,77	$2p^2 4P - 4d 4D^{\circ}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
304,874	4	7,11	47,77	$2p^{2} {}^{4}P - 4d {}^{4}D^{\circ} \ 2p^{2} {}^{4}P - 4d {}^{4}D^{\circ}$	3/ 5/
304,818	4	7,10	47,77	$2p^{2} P - 4d P$ $2p^{2} P - 4d P$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
304,032	2	7,11	47,88		
303,981	2	$\{\begin{array}{c} 7,11 \\ 7,11 \end{array}\}$	47,88	$2p^{2} {}^{4}P - 4d {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
000,001	_	17,10	47,88	$2p^2 ^4P - 4d ^4P^\circ \ 2p^2 ^4P - 4d ^4P^\circ$	$\frac{3}{2}$ $\frac{1}{2}$
303,891	2	$\{\begin{array}{c} 7,10 \\ 7,00 \end{array}\}$	47,88	$2p^{2}P-4d^{3}P$ $2p^{2}P-4d^{4}P^{\circ}$	$\frac{1}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
•	1	7,09	47,88 41,37	$2p^{-1}P - 4a P$ $2p^{-2}P^{\circ} - 5s^{-2}S$	3/2 - 1/2
299,820	0	$\substack{0,02\0,00}$	41,37	2p P - 5s S 2p P - 5s S	$\frac{1}{2}$ $\frac{1}{2}$
299,670	4	0,00	42,39	$2p {}^{1}P^{\circ} - 5d {}^{2}D$	$3/2_{2}^{2}$ $-5/2_{2}^{2}$
292,595				$2p^{-1}$ 5 <i>d</i> 2 <i>D</i> $2p^{-2}P^{\circ}-5d^{-2}D$	1/2-3/2
292,447	3	0,00	42,39	$2p^{2}P - 5d^{2}D$ $2p^{2} P - 5d^{2}D$	/2—-/2 5/7/_
284,346	2	$\frac{7}{7},11$	50,71	$2p^{2} P - 5a D$ $2p^{2} P - 5d D$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
284,296	1	$\left\{ \begin{array}{l} 7,10 \\ 7,09 \\ 2,02 \end{array} \right.$	50,71 50,71	$2p^2 ^4P - 5d ^4D^{\circ}$	$^{3}/_{2}$ — $^{5}/_{2}$
282,213	2	0,02	43,95	$2p ^{2}P^{\circ} - 6d ^{2}D$	$\frac{3}{2} - \frac{5}{2}$
282,093	1	00,00	43,95	$2p ^{2}P^{\circ} - 6d ^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
267,952	1	0,02	46,28	2p ² P°—3p′ ² D	$^{3}/_{2}$ — $^{5}/_{2}$
267,851	0	00,00	46,28	$2p ^{2}P^{\circ} - 3p' ^{2}D$	$^{1}/_{2}$ $^{-3}/_{2}$
264,948	2	0,02	46,81	$2p^{2}P^{\circ}-3p'^{2}P$	$^{3}/_{2}^{-}$ $^{-3}/_{2}^{-}$
264,837	1	00,00	46,81	$2p^{2}P^{\circ}-3p'^{2}P$	$^{1/2}_{2}$ $^{-1/2}_{2}$
				-	

N IV, ground state $1s^2 2s^2 {}^1S^0$ Ionization potential 624864,7 cm⁻¹; 77,468 eV

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J	
7702,96 7582,40	4 2	71,42 71,39	73,03 73,02	2s6hH ^o 2s7iI 2s6g³G 2s7hH ^o	_ _	

λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}},{ m eV}$	Transition	J
7129,18	_	50,34	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	2 – 1
7127,27	1	50,34	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	2 - 2
7122,98	5	50,34	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	2-3
7111,30	1	50,33	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	1 – 1
7109,40	3	50,33	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	1 - 2
7103,28	2	50,33	52,08	$2s3p^{3}P^{\circ} - 2s3d^{3}D$	0 - 1
6380,77	8	48,21	50,15	$2s3s^{1}S - 2s3p^{1}P^{\circ}$	0 – 1
6219,89	4	60,45	62,44	$2p3p^{3}S - 2s4p^{3}P^{\circ}$	1 - 2
6215,43	3	60,45	62,45	$2p3p^{3}S - 2s4p^{3}P^{\circ}$	1-1
6212,41	1	60,45	62,45	$2p3p^{3}S - 2s4p^{3}P^{\circ}$	1 - 0
6119,23	_	61,78	63,80	$2p3d^{1}D^{\circ} - 2s4d^{1}D$	2 – 2
5843,84	_	61,29	63,42	$2s3p^{3}P - 2s3d^{3}P^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
5826,44	_	61,29	63,42	$2s3p^{3}P - 2s3d^{3}P^{\circ}$	$\frac{-}{2} - \frac{-}{1}$
5812,30	_	61,28	63,42	$2s3p^{3}P - 2s3d^{3}P^{\circ}$	$\frac{1}{1} - 2$
5795,08	_	61,28	63,42	$2s3p^{3}P - 2s3d^{3}P^{\circ}$	1 – 1
5736,94	4	59,62	61,78	$2p3p^{1}P - 2p3d^{1}D^{\circ}$	1 - 2
5245,61	3	57,72	60,08	$2p3s^{3}P^{\circ} - 2p3p^{3}D$	2 – 2
5226,69	3	57,70	60,07	$2p3s^{3}P^{\circ} - 2p3p^{3}D$	1 – 1
5205,15	3	57,69	60,07	$2p3s^{3}P^{\circ}-2p3p^{3}D$	0 – 1
5204,29	5	57,72	60,10	$2p3s^{3}P^{\circ} - 2p3p^{3}D$	2 – 3
5200,40	4	57,70	60,08	$2p3s^{3}P^{\circ} - 2p3p^{3}D$	1 - 2
5071,62	_	61,95	64,40	$2p3p^{1}D - 2p3d^{1}P^{\circ}$	2 – 1
4762,10	_	60,10	62,68	$2p3p^{3}D - 2p3d^{3}D^{\circ}$	2 - 2
4752,50		60,10	62,69	$2p3p^{3}D - 2p3d^{3}D^{\circ}$	2 – 3
4740,26	_	60,08	62,69	$2p3p^{3}D - 2p3d^{3}D^{\circ}$	1 - 2
4707,31	4	68,75	71,39	$2s5f^{3}F^{\circ} - 2s6g^{3}G$	_
4606,33	6	68,73	71,42	$2s5g^3G - 2s6hH^\circ$	_
4529,61	_	57,72	60,45	$2p3s^{3}P^{\circ} - 2p3p^{3}S$	2 – 1
4495,86	_	57,70	60,45	$2p3s^{3}P^{\circ} - 2p3p^{3}S$	1 - 1
4479,92	_	57,69	60,45	$2p3s^{3}P^{\circ} - 2p3p^{3}S$	0 - 1
4182,60	-	60,45	63,42	$2p3p^{3}S - 2p3d^{3}P^{\circ}$	1 – 2
4173,67	_	60,45	63,42	$2p3p^{3}S - 2p3d^{3}P^{\circ}$	1 - 1
4057,759	8	50,15	53,21	$2s3p^{1}P^{\circ} - 2s3d^{1}D$	1 - 2
3823,95	0	59,62	62,86	$2p3p^{1}P - 2s4p^{1}P^{0}$	1 – 1
3747,54	6	58,64	61,95	$2p3s^{1}P^{\circ} - 2p3p^{1}D$	1 - 2
3714,43	_	60,10	63,42	$2p3p^{3}D - 2p3d^{3}P^{\circ}$	2 - 2
3694,15	_	60,08	63,42	$2p3p^{3}D - 2p3d^{3}P^{\circ}$	1 - 1
3689,95	_	60,08	63,42	$2p3p^{3}D - 2p3d^{3}P^{\circ}$	1 – 0
3484,96	13	46,77	50,33	$2s3s^{3}S - 2s3p^{3}P^{\circ}$	1 - 0
3482,99	14	46,77	50,33	$2s3s^{3}S - 2s3p^{3}P^{\circ}$	1 - 1
3478,71	15	46,77	50,34	$2s3s^{3}S - 2s3p^{3}P^{\circ}$	1 - 2
3474,55	3	57,72	61,28	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	2 - 1
3463,37	6	57,72	61,29	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	2 – 2
3461,36	2	57,70	61,28	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	1 - 0
3454 , 70	2	57,70	61,28	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	1 - 1
3445,20	2	57,69	61,28	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	0 - 1
3443,59	3	57,70	61,29	$2p3s^{3}P^{\circ} - 2p3p^{3}P$	1 - 2
3 443, 39 3 141, 16	3	60,10	64,04	$2p3p^{3}D - 2s4f^{3}F^{\circ}$	3 – 4
3141,10	2	60,08	64,04	$2p3p^3D - 2s4f^3F^\circ$	2 – 3
3118,79	1	60,07	64,04	$2p3p^{3}D - 2s4f^{3}F^{\circ}$	1 – 2
	6	64,70	68,73	$2s4f^{1}F^{\circ} - 2s5g^{1}G$	3 – 4
3078 , 25	4	68,73	73,02	$285g^{3}G - 287hH^{\circ}$	-
2884,77	2	63,80	68,22	$2s4d^{1}D - 2s5p^{1}P^{\circ}$	2 - 1
2809,35	4	00,00	00,22	20.2 2 200p -	

λ, Α	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
2646,956	5 12	64,04	68,73	$2s4f^{3}F^{\circ} - 2s5g^{3}G$	4 5
2646,176	5 11	64,04	68,73	$2s4f^{3}F^{\circ} - 2s5g^{3}G$	3 ← 4
2645,654		64,04	68,73	$2s4f^{3}F^{\circ} - 2s5g^{3}G$	2 – 3
2594,34	2	59,62	64,40	$2p3p^{1}P - 2p3d^{1}P^{\circ}$	1 - 1
2477,69	8	63,80	68,81	$2s4d^{1}D - 2s5f^{1}F^{\circ}$	2 – 3
2431,55	0	62,45	67,54	$2s4p^{3}P^{\circ} - 2s5s^{3}S$	0 – 1
2431,07	2	62,45	67,54	$2s4p^{3}P^{\circ} - 2s5s^{3}S$	1 – 1
2430,41	3	62,44	67,54	$2s4p^{3}P^{\circ} - 2s5s^{3}S$	2 - 1
2426,54	1	63,43	68,53	$2p3d^{3}P^{\circ} - 2s5d^{3}D$	0 - 1
2424,73	2	63,42	68,53	$2p3d^3P^0 - 2s5d^3D$	1 - 2
2421,65	3	63,42	68,53	$2p3d^{3}P^{\circ} - 2s5d^{3}D$	
2402,05	5	58 , 64		$2p3a^{1}P^{\circ} - 2s4d^{1}D$	2 - 3
2318,09	6		63,80	$2s4d^{3}D - 2s5f^{3}F^{\circ}$	1 – 2
2080,34	6	63,41	68 , 75	284d D = 285f F $2p3d^{1}F^{\circ} = 285g^{1}G$	_
2036,42		62 , 77	68,73	$2s4p^{3}P^{\circ} - 2s5d^{3}D$	3 – 4
2036,42	1	62,45	68,53	$284p^{3}P^{\circ} - 285d^{3}D$ $284p^{3}P^{\circ} - 285d^{3}D$	0 - 1
	4	62,45	68,53	$284p P^{2} - 285d D$	1 – 2
2035,57	5	62,44	68,53	$2s4p^{3}P^{\circ} - 2s5d^{3}D$	2 – 3
1718,551		16,20	23,42	$2s2p^{1}P^{\circ} - 2p^{2}D$	1 — 2
1702,006		61,44	68,73	$2p3d^{3}F^{\circ} - 2s5e^{3}G$	4 — 5
1699,03	4	61,43	68 , 73	$2p3d^{3}F^{\circ} - 2s5g^{3}G$	3 – 4
1696,86	3	61,42	68 , 73	$2p3d^{3}F^{\circ} - 2s5g^{3}G$	2 – 3
1688,11	3	64,04	71,39	$2s4f^{3}F^{\circ} - 2s6g^{3}G$	4 —
1687,82	2	64,04	71,39	$2s4f^{3}F^{\circ} - 2s6g^{3}G$	3 —
1687,60	1	64,04	71,39	$2s4f^{3}F^{\circ} - 2s6g^{3}G$	2
1486,496	2	0,00	8,34	$2s^{2} S - 2s 2p^{3} P^{\circ}$	0 - 1
1446,114		53,21	61,78	$2s3d^{1}D - 2p3d^{1}D^{\circ}$	2 - 2
1438,37	3	62 , 77	71,39	$2p3d^{1}F^{\circ}-2s6g^{1}G$	3 – 4
1326,964	0	52,08	61,42	$2s3d^3D - 2p3d^3F^{\circ}$	1 - 2
1325,685		52,08	61,43	$2s3d^3D - 2p3d^3F^{\circ}$	2 – 3
1323,98	2	52,08	61,44	$2s3d^3D - 2p3d^3F^{\circ}$	3 – 4
1309,557	4	50,15	59,62	$2s3p^{1}P^{\circ} - 2p3p^{1}P$	1 - 1
1296,600	5	53,21	62 , 77	$2s3d^{1}D-2p3d^{1}F^{\circ}$	2 – 3
1284,218		53,21	62,86	$2s3d^{1}D - 2s4p^{1}P^{\circ}$	2 – 1
1273,716	2	50,33	60,07	$2 s 3p^{3}P^{\circ} - 2p3p^{3}D$	1-1
1273,47	3	50,33	60,07	$2s3p^3P^0 - 2p3p^3D$	0 - 1
1272,74	2	50,34	60,08	$2s3p^{3}P^{\circ} - 2p3p^{3}D$	2 - 2
1272,160		50,33	60,08	$2 s3p^{3}P^{\circ} - 2p3p^{3}D$	1 - 2
1270,28	5	50,34	60,10	$2s3p^{3}P^{\circ} - 2p3p^{3}D$	2 – 3
1246,51	2	61,44	71,39	$2p3d^{3}F^{\circ} - 2s6g^{3}G$	4 —
1244,92	1	61,43	71,39	$2p3d^3F^{\circ}-2s6g^3G$	3 –
1243,73	coincides with N V	61,42	71,39	$2p3d^3F^\circ - 2s6g^2G$	2 —
1225,719	4	50,34	60,45	$2s3p^{3}P^{\circ} - 2p3p^{3}S$	2 - 1
1225,192	3	50,33	60,45	$2s3p^{3}P^{\circ} - 2p3p^{3}S$	1-1
1224,960	1	50,33	60,45	$2s3p^{3}P^{\circ} - 2p3p^{3}S$	0-1
1188,006	6	48,21	58,64	$2s3s^{1}S - 2p3s^{1}P^{\circ}$	0 - 1
1169,478	1	52,08	62,68	$2s3d^3D - 2p3d^3D^{\circ}$	
1169,063	2	52,08	62,68	$2s3d^3D - 2p3d^3D^{\circ}$	1 - 1
1168.599	3	52,08	62,69	$2s3d^3D - 2p3d^3D^{\circ}$	2 – 2
1136,241	2	46,77	57 , 69	$2s3s^{3}S - 2p3s^{3}P^{\circ}$	3 – 3
1135,244	3	46,77	57,70	$2s3s^{3}S - 2p3s^{3}P^{\circ}$ $2s3s^{3}S - 2p3s^{3}P^{\circ}$	1 - 0
1133,117	4	46,77	57,72	$2838^{3}S - 2p38^{3}P^{\circ}$ $2838^{3}S - 2p38^{3}P^{\circ}$	1 – 1
1086,691	2	50,34	61,75	$2s3p^{3}P^{\circ} - 2s4s^{3}S$	1 - 2
1086,269	1	50,33	61,75	$283p^{3}P^{\circ} - 284s^{3}S$ $283p^{3}P^{\circ} - 284s^{3}S$	2 – 1
1086,084	coincides	50,33	61,75	$283p^{3}P^{\circ} - 284s^{3}S$ $283p^{3}P^{\circ} - 284s^{3}S$	1 - 1
,	with N I	2 - ,00	01,70	200p F - 2848 S	0 - 1
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λ, Α	I	E _H , eV	E _B , eV	Transition	J
1078,708 1036,16 955,335 948,540 948,244 948,155 924,274	6 8 20 5 4 2	53,21 52,08 16,20 50,34 50,33 50,33 8,36	64,70 64,04 29,18 63,41 63,41 21,77	$2s3d^{1}D - 2s4f^{1}F^{\circ}$ $2s3d^{3}D - 2s4f^{3}F^{\circ}$ $2s2p^{1}P^{\circ} - 2p^{2}^{1}S$ $2r3p^{3}P^{\circ} - 2s4d^{3}D$ $2s3p^{3}P^{\circ} - 2s4d^{3}D$ $2s3p^{3}P^{\circ} - 2s4d^{3}D$ $2s3p^{3}P^{\circ} - 2s4d^{3}D$ $2s2p^{3}P^{\circ} - 2p^{2}^{3}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
923,669 923,211 923,045 922,507 921,982 823,273 765,140 463,743 420,758 387,353 352,058 351,931 345,201 345,107 345,063	10 12 10 10 10 2 17 3 1 4 4 5 3 3 5	8,34 8,36 8,34 8,33 8,34 8,36 0,00 23,42 29,18 16,20 29,18 23,42 21,77 21,77 21,77	21,76 21,79 21,77 21,77 21,79 23,42 16,20 50,15 58,64 48,21 64,40 58,64 57,69 57,70 57,72	$\begin{array}{c} 2s2p \ ^{3}P^{\circ}-2p^{2} \ ^{3}P \\ 2s2p \ ^{3}P^{\circ}-2p^{2} \ ^{1}D \\ 2s^{2} \ ^{1}S-2s2p \ ^{1}P^{\circ} \\ 2p^{2} \ ^{1}D-2s3p \ ^{1}P^{\circ} \\ 2p^{2} \ ^{1}S-2p3s \ ^{1}P^{\circ} \\ 2p^{2} \ ^{1}S-2p3d \ ^{1}P^{\circ} \\ 2p^{2} \ ^{3}P-2p3s \ ^{3}P^{\circ} \\$	$ \begin{array}{c} 1 - 0 \\ 2 - 2 \\ 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 2 - 2 \\ 0 - 1 \\ 2 - 1 \\ 0 - 1 \\ 1 - 0 \\ 0 - 1 \\ 2 - 1 \\ 1 - 0 \\ 1 - 1 \\ 2 - 2 \end{array} $
345,023 344,915 335,050 323,175 322,724 322,570	3 11 7 9 8	21,76 21,77 16,20 23,42 8,36 8,34	57,70 57,72 53,21 61,78 46,77 46,77	$2p^{2} {}^{3}P - 2p3s^{3}P^{\circ}$ $2p^{2} {}^{3}P - 2p3s^{3}p^{\circ}$ $2s2p^{1}P^{\circ} - 2s3d^{1}D$ $2p^{2} {}^{1}D - 2p3d^{1}D^{\circ}$ $2s2p {}^{3}P^{\circ} - 2s3s {}^{3}S$ $2s2p {}^{3}P^{\circ} - 2s3s {}^{3}S$	0-1 $1-2$ $1-2$ $2-2$ $2-1$ $1-1$
322,503 315,053 303,163 303,123 303,079	7 8 4 6 4	8,33 23,42 21,79 21,79 21,77	46,77 62,77 62,68 62,69 62,68	$2s2p ^3P^{\circ}\!\!\!\!-\! 2s3s ^3S \ 2p^2 ^1D - 2p3d ^1F^{\circ} \ 2p^2 ^3P - 2p3d ^3D^{\circ} \ 2p^2 ^3P - 2p3d ^3D^{\circ} \ 2p^2 ^3P - 2p3d ^3D^{\circ} \ 2p^2 ^3P - 2p3d ^3D^{\circ}$	0—1 2—3 2—2 2—3 1—1
303,048 303,009 300,316 297,815 297,768	5 4 3 5 3	21,77 21,76 23,42 21,79 21,79	62,68 62,68 64,70 63,42 63,42	$2p^2 \ ^3P$ — $2p3d \ ^3D^{\circ}$ $2p^2 \ ^3P$ — $2p3d \ ^3D^{\circ}$ $2p^2 \ ^1D$ — $2s4f \ ^1F^{\circ}$ $2p^2 \ ^3P$ — $2p3d \ ^3P^{\circ}$ $2p^2 \ ^3P$ — $2p3d \ ^3P^{\circ}$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-3 \\ 2-2 \\ 2-1 \end{array} $
297,712 297,644 297,595 285,563 283,579	3 4 3 5 12	21,77 21,77 21,76 16,20 8,36	63,42 63,42 63,42 59,62 52,08	$2p^2 ^3P - 2p3d ^3P^\circ \ 2p^2 ^3P - 2p3d ^3P^\circ \ 2p^2 ^3P - 2p3d ^3P^\circ \ 2s2p ^1P^\circ - 2p3p ^1P \ 2s2p ^3P^\circ - 2s3d ^3D$	$ \begin{array}{r} 1-2 \\ 1-0,1 \\ 0-1 \\ 1-1 \\ 2-3 \end{array} $
283,470 283,420 270,995 260,455 247,205	11 10 6 2 10	8,34 8,33 16,20 16,20 0,00	52,08 52,08 61,95 63,80 50,15	$2s2p^{3}P^{\circ}-2s3d^{3}D$ $2s2p^{3}P^{\circ}-2s3d^{3}D$ $2s2p^{1}P^{\circ}-2p3p^{1}D$ $2s2p^{1}P^{\circ}-2s4d^{1}D$ $2s^{2}^{1}S-2s3p^{1}P^{\circ}$	$ \begin{array}{r} 1 - 2 \\ 0 - 1 \\ 1 - 2 \\ 1 - 2 \\ 0 - 1 \end{array} $
239,693 239,618 239,210	1 1 2	$\begin{array}{c} 8,36 \\ 8,36 \\ 8,34 \\ 8,33 \\ 21.79 \end{array}$	60,08 60,10 60,08 60,07 73,61	$2s2p^{3}P^{\circ}-2p3p^{3}D$ $2s2p^{3}P^{\circ}-2p3p^{3}D$ $2s2p^{3}P^{\circ}-2p3p^{3}D$ $2s2p^{3}P^{\circ}-2p3p^{3}D$ $2p^{2}^{3}P^{\circ}-2p4d^{3}D^{\circ}$	2-2 2-3 1-2 0-1 2-3
239,161	1	21,77	73,61	$2p^2 ^3P - 2p4d ^3D^{\circ}$	0-1; 1-2
237,983	3	8.36	60,45	$2s2p^{3}P^{\circ}-2p3p^{3}S$	2-1
237,903 237,860	2 1	8,34 8,33	60,45 $60,45$	$2s2p^{3}P^{\circ}-2p3p^{3}S$ $2s2p^{3}P^{\circ}-2p3p^{3}S$	1—1 0—1

λ, Α	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
234 ,249 234 ,195 234 ,124	2 4 3	8,36 8,36 { 8,33 { 8,34	61,28 61,29 61,28 61,29	$2s2p^{3}P^{\circ}-2p3p^{3}P$ $2s2p^{3}P^{\circ}-2p3p^{3}P$ $2s2p^{3}P^{\circ}-2p3p^{3}P$ $2s2p^{3}P^{\circ}-2p3p^{3}P$	2—1 2—2 0—1 1—2
225,205 225,136 225,098 218,085 217,227	5 4 3 1 1	8,36 8,34 8,33 21,77 16,20	63,41 63,41 63,41 78,63 73,28	$2s2p^{3}P^{\circ}-2s4d^{3}D$ $2s2p^{3}P^{\circ}-2s4d^{3}D$ $2s2p^{3}P^{\circ}-2s4d^{3}D$ $2p^{2}^{3}P-2p5d^{3}D^{\circ}$ $2s2p^{1}P^{\circ}-2p4p^{1}D$	2-3 1-2 0-1 2-3 1-2
211,396 206,021 205,960 197,230	$egin{array}{c} 0 \ 2 \ 2 \ 3 \end{array}$	8,33 0,00	58,64 68,53 68,53 62,86	$2s^{2} {}^{1}S$ — $2p3s {}^{1}P^{\circ}$ $2s2p {}^{3}P^{\circ}$ — $2s5d {}^{3}D$ $2s2p {}^{3}P^{\circ}$ — $2s5d {}^{3}D$ $2s^{2} {}^{1}S$ — $2s4p {}^{1}P^{\circ}$	0-1 2-3 0-1 1-2 0-1
197,007 196,954 181,746	1 0 1	8,36 8,33 0,00	71,29 71,29 68,22	$2s2p^{3}P^{\circ}-2s6d^{3}D$ $2s2p^{3}P^{\circ}-2s6d^{3}D$ $2s^{2}{}^{1}S-2s5p^{1}P^{\circ}$	2-3 { 0-1; 1-2 0-1

N V, ground state $1s^2 2s \, {}^2S_{1/2}$ Ionization potential $789537.2 \, \, \mathrm{cm^{-k}}; \, 97.883 \, \mathrm{eV}$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
7628,0	<u> </u>	90,94	92,57	$7f^2F^O - 8d^2D$	_
7618,46	5	90,94	92,57	7ghi – 8hik	_
7615,2	_	90,94	92,57	7 fgh – 8 ghi	_
7600,2	_	90,94	92,57	$7 d^2 D - 8 f^2 F$	_
7327,8	_	90,87	92,57	$7p^2P^0-8d^2D$	_
6717,2	_	90,68	92,53	$7s^2S - 8p^2P^{\circ}$	_
5273,49	_	88,33	90,68	$6p^2P^0-7s^2S$	_
5067,0	_	88,43	90,87	$6d^2D - 7p^2P^{\circ}$	_
4951,27	-	88,44	90,94	$6f^2F^O - 7d^2D$	_
4944,56	9	88,44	90,94	6fgh – 7ghi	_
4933,8	_	88,43	90,94	$6d^2D - 7f^2F^{\circ}$	_
4749 , 73	_	88,33	90,94	$6d^2P^{\circ}-7d^2D$	_
4619,98	10	56,55	59,23	$3s^{2}S - 3p^{2}P^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
4603,73	12	56,55	59,24	$3s^2S - 3p^2P^\circ$	$\frac{1}{2} - \frac{3}{2}$
4334,0	_	88,02	90,87	$6s^2S - 7p^2P^\circ$	-
3161,68	3	84,10	88,02	$5p^2P^0-6s^2S$	$\frac{3}{2} - \frac{1}{2}$
3159,75	2	84,09	88,02	$5p^2P^\circ - 6s^2S$	$\frac{1}{2} - \frac{1}{2}$
2998,43	5	88,44	92,57	6fgh – 8ghi	
2981,31	10	84,28	88,44	$5g^2G - 6h^3H^O$	_
2980,78	8	84,28	88,44	$5f^2F^0-6g^2G$	_
2974,52	6	84,27	88,44	$5d^2D - 6f^2F^{\circ}$	_
2859,16	5	84,10	88,43	$5p^2P^\circ - 6d^2D$	$\frac{3}{2} - \frac{5}{2}$
2858,03	4	84,09	88,43	$5p^2P^0-6d^2D$	$\frac{1}{2} - \frac{3}{2}$
2591,44	1	83,55	88,33	$5s^2S - 6p^2P^\circ$	$\frac{1}{2} - \frac{1}{2}$
2590,81	2	83,55	88,33	$5s^2S - 6p^2P^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
1882,92	1	84,10	90,68	$5p^2P^{\circ} - 7s^2S$	$\frac{3}{2} - \frac{1}{2}$
1882,36	0	84,09	90,68	$5p^{2}P^{\circ} - 7s^{2}S$	$\frac{1}{2} - \frac{1}{2}$
1860,37	6	84,28	90,94	$5f^2F^0 - 7y^2G$	_
1857,88	3	84,27	90,94	$5d^2D - 7f^2F^{\circ}$	$\frac{5}{2} - \frac{7}{2}, \frac{5}{2}$
1857 , 69	3	84,27	90,94	$5d^{2}D - 7f^{2}F^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
1811,62	1	84,10	90,94	$5p^2P^\circ - 7d^2D$	$\frac{3}{2} - \frac{5}{2}, \frac{3}{2}$
ın					, -

λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
1811,08	0	84,09	90,94	$5p^2P^\circ - 7d^2D$	$\frac{1}{2} - \frac{3}{2}$
1703,218	4	76,27	83,55	$4p^2P^{\circ}-5s^2S$	$\frac{3}{2} - \frac{1}{2}$
1702,25	3	76,26	83,55	$4p^2P^\circ - 4s^2S$	$\frac{1}{2} - \frac{1}{2}$
	v	10,20	00,00	•	coincides
1655 000	0	5 6.61	04.10	$4d^2D - 5p^2P^{\circ}$	with NIV $\frac{3}{2} - \frac{1}{2}$; $\frac{5}{2} - \frac{3}{2}$
1655,922	2	76,61	84, 10	$4d D = 5p P$ $4f^{2}F^{\circ} - 5d^{2}D$	$\frac{7_2 - 7_2}{5_2 - 3_2}, \frac{7_2 - 7_2}{7_2 - 5_2}$
1621,966	1	76,63	84,27	•	/2 //2; /2 /2
1619,688	12	76 , 63	84,28	$4\int_{2}^{2} F^{O} - 5g^{2}G$	-
1616,328	9	76,61	84,28	$4d^{2}D - 5f^{2}F^{0}$	$\frac{-}{\frac{3}{2}-\frac{5}{2}}$
1549,336	6	76,27	84,27	$4p^{2}P^{\circ} - 5d^{2}D$	
1548.	_	76,26	84,27	$4p^2P^{\circ} - 5d^2D$	$\frac{1}{2} - \frac{3}{2}$ coincides
					with NIV
1495,5	2	84,28	92,57	$5\int^2 F^\circ - 8g^2 G$	_
1389,822	2	75,17	84,09	$4s^{2}S - 5p^{2}P^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
1389,514	3	75,17	84,10	$4s^2S - 5p^2P^\circ$	$\frac{1}{2} - \frac{3}{2}$
1242,804	19	0,00	9,98	$2s^2S - 2p^2P^\circ$	$\frac{1}{2} - \frac{1}{2}$
1238,821	20	0,00	10,01	$2s^2S - 2p^2P^\circ$	$\frac{1}{2} - \frac{3}{2}$
1049,65	3	76,63	88,44	$4f^2F^0-6g^2G$	_
1048,20	2	76,61	88,44	$4d^2D - 6f^2F^{\circ}$	_
778,172	2	59,24	75,17	$3p^{2}P^{\circ} - 4s^{2}S$	$\frac{3}{2} - \frac{1}{2}$
777,712	1	59,23	75,17	$3p^{2}P^{\circ} - 4s^{2}S$	$\frac{1}{2} - \frac{1}{2}$
748,291	9	60,06	76,63	$3d^2D - 4f^2F^{\circ}$	$\frac{5}{2} - \frac{7}{2}$
748,195	8	60,06	76,63	$3d^2D - 4\int^2F^\circ$	$\frac{3}{2} - \frac{5}{2}$
713,860	8	59,24	76,61	$3p^2P^{\circ}-4d^2D$	$\frac{3}{2} - \frac{5}{2}$
713,518	6	59,23	76,61	$3p^2P^\circ - 4d^2D$	$\frac{1}{2} - \frac{3}{2}$
628,874	3	56,55	76,26	$3s^2S^{\circ} - 4p^2P^{\circ}$	$\frac{1}{2} - \frac{1}{2}$
628,744	5	56,55	76,27	$2s^2S - 4p^2P^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
511,834	5	60,06	84,28	$2d^2D - 5\int_0^2 F^{\circ}$	
450,08	3	56,55	84, 10	$3s^{2}S - 5p^{2}P^{\circ}$	$\frac{1}{2} - \frac{3}{2}, \frac{1}{2}$
436,85	4	60,06	88,44	$3d^{2}D - 6g^{2}F^{0}$	-
424,75	2	59,24	88,43	$3p^{2}P^{\circ} - 6d^{2}D$	$\frac{3}{2} - \frac{5}{2}$
424,61	1	59,23	88,43	$3p^2P^0-6d^2D$	$\frac{1}{2} - \frac{3}{2}$
266,378	84	10.01	56,55	$2p$ $^2P^{\circ}$ — $3s$ 2S	3/2—1/2
266,197	80	9,98	56,55	$2p {}^{2}P^{\circ} - 3s {}^{2}S$	$\frac{1}{2} - \frac{1}{2}$
247,709	100	10,01	60,06	$2p {}^{2}P^{\circ} - 3d {}^{2}D$ $2p {}^{2}P^{\circ} - 3d {}^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$
$247,564 \\ 209,306$	85 80	9,98 (),00	$60,05 \ 59,23$	2p - P - 3a - D $2s - 3p - 2P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
209,274	80	0,00	59,24	$2s^{2}S - 3p^{2}P^{\circ}$	1/2 - 3/2
190,250	32	10,01	75,17	$2p^{-2}P^{\circ}$ —4s ^{2}S	$^{3}/_{2}$ — $^{1}/_{2}$
190,158	$\frac{32}{20}$	9,98	75,17	$2p^{-2}P^{\circ}$ —4s ${}^{2}S$	$^{1}/_{2}^{-}$ _ $^{1}/_{2}^{-}$
186,153	$\overline{62}$	10,01	76,61	$2p^{-2}P^{\circ}-4d^{-2}D$	$\frac{3}{2} - \frac{5}{2}$
186,069	52	9.98	76,61	$2p^{2}P^{\circ}-4d^{2}I$	$\frac{1}{3} / \frac{3}{2}$
168,590	12	10,01	83,54	$2p^{2}P^{\circ} - 5s^{2}S$	$3/2_2^{-1}/2_2$
168,517	5	9.98	83,5 7	$\frac{2p}{2p} {}^{2}P^{\circ} - 5s {}^{2}S$ $\frac{2p}{2p} {}^{2}P^{\circ} - 5d {}^{2}D$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
166,947	$\frac{52}{44}$	$^{10,01}_{9,98}$	$84,27 \\ 84,27$	$2p ^{2}P - 5d ^{2}D$ $2p ^{2}P^{\circ} - 5d ^{2}D$	1/2-3/2
,881,866,381 162,565	48	0,00	76,26	$2s^{2}S-4p^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
158,933	7	10,01	88,02	$2p^{-2}P^{\circ}-6s^{-2}S$	$^{3}/_{2}$ — $^{1}/_{2}$
158,867	4	9.98	88,02	$2p^{-2}P^{\circ}-6s^{-2}S$	$\frac{1}{2} \frac{1}{2} \frac{1}{2}$
158,090	36	10,01	88,43	$2p^{2}P^{\circ}-6d^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$
158,030	$\frac{24}{c}$	9,98	88,43 90,68	$\frac{2p}{2p} {}^{2}P^{\circ} - 6d {}^{2}D$ $\frac{2p}{2p} {}^{2}P^{\circ} - 7s {}^{2}S$	$\frac{1/2}{3/2}$
153,683 153,624	$rac{6}{3}$	$10,01 \\ 9,98$	90,68 90,68	$2p ^{2}P - 7s ^{2}S$ $2p ^{2}P^{\circ} - 7s ^{2}S$	1/2 - 1/2
				*	3/25/2
153,192	28	10,01 9,98	90,93 90,93	$\frac{2p}{2p} ^{2}P^{\circ} - 7s ^{2}S$ $\frac{2p}{2} ^{2}P^{\circ} - 7d ^{2}D$	$\frac{3}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$
153,136 150,488	18 5	10,01	92,39	$\frac{2p}{2p} {}^{2}P^{\circ} - 8s {}^{2}S$	$\frac{3}{2} - \frac{1}{2}$
190 '. TOO	U	,	,	-r	

					<u> </u>
λ, Α	I	$E_{ m H}^{},~{ m eV}$	$E_{\rm B}$, eV	Transition	J
150 ,429 150 ,171	2 14	9,98 10,01	92,39 92,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1/2}_{3/2}$ $^{-1/2}_{2}$
150 ,116 148 ,387 148 ,328 148 ,168 148 ,116	7 4 1 7 4	9.98 10,01 9,98 10,01 9,98	92,57 93,55 93,55 93,68 93,68	$2p ^{2}P^{\circ} - 8d ^{2}D$ $2p ^{2}P^{\circ} - 9s ^{2}S$ $2p ^{2}P^{\circ} - 9s ^{2}S$ $2p ^{2}P^{\circ} - 9d ^{2}D$ $2p ^{2}P^{\circ} - 9d ^{2}D$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \end{array} $
147,433 146,921 146,767 146,716 145,742	24 3 6 3 5	0,00 10,01 10,01 9,98 10,01	84,09 94,39 94,48 94,48 95,07	$2s {}^{2}S - 5p {}^{2}P^{\circ} \ 2p {}^{2}P^{\circ} - 10s {}^{2}S \ 2p {}^{2}P^{\circ} - 10d {}^{2}D \ 2p {}^{2}P^{\circ} - 10d {}^{2}D \ 2p {}^{2}P^{\circ} - 11d {}^{2}D$	$ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $
144,978 144,392 143,914 143,520 143,241	4 3 2 1 1	10,01 10,01 10,01 10,01 10,01	95,51 95,85 96,15 96,39 96,55	$2p \ ^{2}P^{\circ}-12d \ ^{2}D$ $2p \ ^{2}P^{\circ}-13d \ ^{2}D$ $2p \ ^{2}P^{\circ}-14d \ ^{2}D$ $2p \ ^{2}P^{\circ}-15d \ ^{2}D$ $2p \ ^{2}P^{\circ}-16d \ ^{2}D$	3/2 $5/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $5/2$
142,981 142,797 140,364 136,429 133,994	0 0 16 8 7	10,01 10,01 0,00 0,00 0,00	96,72 96,83 88,33 90,87 92,52	$2p ^{2}P^{\circ}$ —17 $d ^{2}D$ $2p ^{2}P^{\circ}$ —18 $d ^{2}D$ $2s ^{2}S$ —6 $p ^{2}P^{\circ}$ $2s ^{2}S$ —7 $p ^{2}P^{\circ}$ $2s ^{2}S$ —8 $p ^{2}P^{\circ}$	3/2 - 5/2 $3/2 - 5/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$
132,383 131,254 130,431 129,811 129,337	6 5 4 3 2	0,00 0,00 0,00 0,00 0,00	93,65 94,46 95,05 95,50 95,84	$2s ^2S - 9p ^2P^{\circ} \ 2s ^2S - 10p ^2P^{\circ} \ 2s ^2S - 11p ^2P^{\circ} \ 2s ^2S - 12p ^2P^{\circ} \ 2s ^2S - 13p ^2P^{\circ}$	$^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$
128,954 128,662 128,430 128,229	1 1 0 0	0,00 0,00 0,00 0,00	96,14 96,36 96,53 96,68	2s ² S—14p ² P° 2s ² S—15p ² P° 2s ² S—16p ² P° 2s ² S—17p ² P°	1/2 - 3/2 $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$

N VI, ground state $1s^{2}$ $^{1}S_{0}$ Ionization potential 4452800 cm $^{-1}$; 552,04 eV

λ, Å	I	E _H , eV	E _B . eV	Transition	J
29,084	_	0,00	426,27	$1s^{2} {}^{1}S - 2p {}^{3}P^{\circ}$	0—1
28,787	_	0,00	430,67	$1s^{2} {}^{1}S - 2p {}^{1}P^{\circ}$	0—1
24,898	_	0,00	497,94	$1s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$	0—1
23,771		0,00	521,55	$1s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$	0—1

OXYGEN, Z = 8 O I, ground state $1s^{2}2s^{2}2p^{4}{}^{3}P_{2}$

Ionization potential $109\,837,03\,\text{cm}^{-1}$; $13,617\,\text{eV}$

	h poten	tiai 100		, 10,017 ev	_
λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
18243,63 18021,21 13165,11 13164,85 13163,89	22 23 24 26 25	12,08 12,08 10,99 10,99 10,99	12,76 12,76 11,93 11,93 11,93	$3d\ ^{3}D^{\circ}-4f\ ^{3}F$ $3d\ ^{5}D^{\circ}-4f\ ^{5}F$ $3p\ ^{3}P-4s\ ^{3}S^{\circ}$ $3p\ ^{3}P-4s\ ^{3}S^{\circ}$ $3p\ ^{3}P-4s\ ^{3}S^{\circ}$	3, 2, 1—4, 3, 2 — 0—1 2—1 1—1
12570,04 12464,02 11302,376 11297,682 11295,104	20 21 23 22 21	12,09 12,08 10,74 10,74 10,74	13,07 13,07 11,84 11,84 11,84	$3d ^3D^{\circ} - 5f ^3F$ $3d ^5D^{\circ} - 5f ^5F$ $3p ^5P - 4s ^5S^{\circ}$ $3p ^5P - 4s ^5S^{\circ}$ $3p ^5P - 4s ^5S^{\circ}$	3, 2, 1—4, 3, 2 — 3—2 2—2 1—2
11287,318 11287,022 11286,914 11286,344 10753,530	21 21 24 23 17	10,99 10,99 10,99 10,99 12,09	12,09 12,09 12,09 12,09 13,24	3p 3P-3d 3D° 3p 3P-3d 3D° 3p 3P-3d 3D° 3p 3P-3d 3D° 3d 3D°-6f 3F	$\begin{array}{c} 0-1 \\ 2-2, \ 1 \\ 2-3 \\ 1-2, \ 1 \\ 3, \ 2, \ 1-4, \ 3, \ 2 \end{array}$
10675,940 10675,725 10167,252 9891,743 9826,002	16 17 10 13 12	12,08 12,08 9,52 12,08 12,08	13,24 13,24 10,74 13,34 13,34	$3d ^5D^{\circ} - 6f ^5F$ $3d ^5D^{\circ} - 6f ^5F$ $3s ^3S^{\circ} - 3p ^5P$ $3d ^3D^{\circ} - 7f ^3F$ $3d ^5D^{\circ} - 7f ^5F$	$\begin{array}{c} -\\ -\\ 1-2\\ 3, 2, 1-4, 3, 2\\ 2, 1, 0-3, 2 \end{array}$
9825,847 9760,65 9741,49 9677,41 9522,01	13 5 4 1 4	12,08 { 14,13 14,13 14,13 14,13 14,13	13,34 15,40 15,40 15,40 15,41 15,40	$3d^{5}D^{\circ}$ —7 $f^{5}F$ $3p'^{1}F$ — $3d'^{1}G^{\circ}$ $3p'^{1}F$ — $3d'^{3}G^{\circ}$ $3p'^{1}F$ — $3d'^{3}G^{\circ}$ $3p'^{1}F$ — $3d'^{1}F^{\circ}$ $3p'^{3}F$ — $3d'^{3}F^{\circ}$	4, 3—4, 3, 2 3—4 3—4 3—4 3—3 4—4
9505,67 9499,39 9498,04 9492,76	5 0 8 1	14,10 14,10 14,10 14,10 14,10	15,40 15,40 15,40 15,40 15,40	$3p' \ ^3F - 3d' \ ^1G^{\circ}$ $3p' \ ^3F - 3d' \ ^1G^{\circ}$ $3p' \ ^3F - 3d' \ ^3G^{\circ}$ $3p' \ ^3F - 3d' \ ^3G^{\circ}$ $3p' \ ^3F - 3d' \ ^3G^{\circ}$ $3p' \ ^3F - 3d' \ ^3G^{\circ}$	3-4 4-4 4-5 2-3 3-3
9487,49 9399,24 9266,006 9265,938 9262,774 9262,671	6 1 24 21 23 22	14,10 12,73 10,74 10,74 10,74 10,74	15,40 14,05 12,08 12,08 12,08 12,08	$3p'$ $^{3}F - 3d'$ $^{3}G^{\circ}$ $3s'$ $^{1}D^{\circ} - 3p'$ ^{3}D $3p$ $^{5}P - 3d$ $^{5}D^{\circ}$ $3p$ $^{5}P - 3d$ $^{5}D^{\circ}$ $3p$ $^{5}P - 3d$ $^{5}D^{\circ}$ $3p$ $^{5}P - 3d$ $^{5}D^{\circ}$	3-4 2-1 3-4 3-3 2-3 2-2
9262,584 9260,935 9260,845 9260,806 9156,02	19 20 21 20 4	10,74 10,74 10,74 10,74 14,05	12,08 12,08 12,08 12,08 12,08	3p ⁵ P-3d ⁵ D° 3p ⁵ P-3d ⁵ D° 3p ⁵ P-3d ⁵ D° 3p ⁵ P-3d ⁵ D° 3p' ³ D-3d' ³ F°	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 1-0 \\ 3-4 \end{array} $
8820,45 8819,60 8586,00 8508,66 8446,758	15 5 2 2 29	12,73 — 14,37 9,52	14,13 — — 15,83 10,99	3s' 1D°-3p' 1F 	2—3 — — 1—1 1—1
8446,359 8446,250 8429,128 8428,342 8426,326	30 27 1 2 4	9,52 9,52 14,12 14,12 14,12	10,99 10,99 15,59 15,59 15,59	$3s {}^{3}S^{\circ} - 3p {}^{3}P$ $3s {}^{3}S^{\circ} - 3p {}^{3}P$ $3s'' {}^{3}P^{\circ} - 4p' {}^{3}D$ $3s'' {}^{3}P^{\circ} - 4p' {}^{3}D$ $3s'' {}^{3}P^{\circ} - 4p' {}^{3}D$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 0-1 \\ 4-2 \\ 2-3 \\ 1-1 \end{array} $
8424 ,780 8420 ,968	1	14,12 14,12	15,59 15,59	3s" ³ P°—4p' ³ D 3s" ³ P°—4p' ³ D	2—2

1-2 1-1 2-2, 3
1—1
2—1 3—3 3—2 2—3 2—2
1-2 0-1 1-1 1-2 2-3
3-4 2-2 3-3 3-2 1-2
2-1 2-2 2-3 3-2 1-1
2—1 1—0 0—1 1—2 1—1
2-3 2-2 2-1 0-1 2-1
1-1 - 2-2 1-2 0-3, 2, 1
1-2, 1 2-1 2-2 1-0 3-2
2-2 1-2 3-4 3-4 1-2, 3
1—1 4—4 3—4 2—3
4-5 3-3 3-4 3-4, 3, 2 2-3, 2, 1 1-2, 1, 0 3-4

λ, Ä	I	$E_{ m H}$, eV	E _B , eV	Transition	J
6046,494 6046,438 6046,232 5995,28 5993,18	10 13 12 3 1	10,99 10,99 10,99 14,05 14,05	13,04 13,04 13,04 16,11	$3p ^3P - 6s ^3S^{\circ}$ $3p ^3P - 6s ^3S^{\circ}$ $3p ^3P - 6s ^3S^{\circ}$ $3p' ^3D - 4d' ^3P^{\circ}$ $3p' ^3D - 4d' ^3P^{\circ}$	0-1 $2-1$ $1-1$ $2, 3-2$ $1-1$
5991,93 5991,34 5958,583 5958,386 5750,424	2 1 13 12 5	14,05 14,05 (10,99 10,99 10,99 13,13	16,11 16,11 13,07 13,07 13,07 15,29	$3p' \ ^3D - 4d' \ ^3P^{\circ} \ 3p' \ ^3D - 4d' \ ^3P^{\circ} \ 3p \ ^3P - 5d \ ^3D^{\circ} \ 3p \ ^3P - 5d \ ^3D^{\circ} \ 6p \ ^3P - 3d' \ ^3P^{\circ}$	$\begin{array}{c} 2-1\\ 1-0\\ 0-1\\ 2-3, 2, 1\\ 1-2, 1\\ 2, 1-2 \end{array}$
5731 ,103 5720 ,613 5555 ,003 5554 ,832 5512 ,770	3 1 9 8 8	13,13 13,13 10,99 10,99 10,99	15,29 15,30 13,22 13,22 13,24	$\begin{array}{c} 6p\ ^3P - 3d'\ ^3P^\circ \\ 6p\ ^3P - 3d'\ ^3P^\circ \\ 3p\ ^3P - 7s\ ^3S^\circ \\ 3p\ ^3P - 7s\ ^3S^\circ \\ 3p\ ^3P - 6d\ ^3D^\circ \end{array}$	2, 1, 0-1 1-0 2-1 1-1 2-3, 2, 1
5512,603 5492,8 5486,6 5436,861 5435,775	7 3 3 11 10	10,99 14,13 14,13 10,74 10,74	13 ,24 16 ,39 16 ,39 13 ,02 13 ,02	$3p ^3P - 6d ^3D^{\circ}$ $3p' ^1F - 5d' ^1G^{\circ}$ $3p' ^1F - 5d' ^3G^{\circ}$ $3p ^5P - 6s ^5S^{\circ}$ $3p ^5P - 6s ^5S^{\circ}$	$ \begin{array}{r} 1-2, & 1 \\ 3-4 \\ 3-4 \\ 3-2 \\ 2-2 \end{array} $
5435 ,176 5410 ,76 5408 ,87 5408 ,59 5404 ,87	9 4 3 4 3	10,74 \$14,10 \$14,10 14,10 14,10	13,02 16,39 16,39 16,39 16,39	$3p ^5P - 6s ^5S^{\circ}$ $3p' ^3F - 5d' ^1G^{\circ}$ $3p' ^3F - 5d' ^3F^{\circ}$ $3p' ^3F - 5d' ^3G^{\circ}$ $3p' ^3F - 5d' ^3G^{\circ}$	1—2 3—4 4—4 3—4 4—5
5330 ,739 5329 ,685 5329 ,101 5299 ,044 5298 ,887	13 12 11 5 4	10,74 10,74 10,74 10,99 10,99	13,06 13,06 13,06 13,33 13,33	$3p ^5P - 5d ^5D^{\circ}$ $3p ^5P - 5d ^5D^{\circ}$ $3p ^5P - 5d ^5D^{\circ}$ $3p ^5P - 8s ^3S^{\circ}$ $3p ^5P - 8s ^3S^{\circ}$	3-4, 3, 2 2-3, 2, 1 1-2, 1, 0 2-1 1-1
5275 ,121 5274 ,968 5146 ,06 5130 ,53	4 2 5 3	10,99 10,99 10,99 12,87 12,87 10,99	13,34 13,34 13,40 15,29 15,29 13,40	$3p ^{5}P - 7d ^{3}D^{\circ}$ $3p ^{5}P - 7d ^{3}D^{\circ}$ $3p ^{3}P - 9s ^{3}S^{\circ}$ $5p ^{3}P - 3d' ^{3}P^{\circ}$ $5p ^{3}P - 3d' ^{3}P^{\circ}$ $3p ^{3}P - 8d ^{3}D^{\circ}$	$\begin{array}{c} 2-3,\ 2,\ 1\\ 1-2,\ 1\\ 2-1\\ 2,\ 1-2\\ 2,\ 1,\ 0-1\\ 2-1,\ 2,\ 3\\ \end{array}$
5047,70 5037,16 5020,217 5019,291 5018,783 4968,793	5 15 7 6 5 8		 13,21 13,21 13,21 13,23	- 3p ⁵ P-7s ⁵ S° 3p ⁵ P-7s ⁵ S° 3p ⁵ P-7s ⁵ S° 3p ⁵ P-6d ⁵ D°	- 3-2 2-2 1-2 3-4, 3, 2
4967,882 4967,378 4802,981 4802,132 4801,80	7 6 4 3 2	10,74 10,74 10,74 10,74 10,74	13,23 13,23 13,32 13,32 13,32	$3p ^5P - 6d ^5D^{\circ}$ $3p ^5P - 6d ^5D^{\circ}$ $3p ^5P - 8s ^5S^{\circ}$ $3p ^5P - 8s ^5S^{\circ}$ $3p ^5P - 8s ^5S^{\circ}$	2-3, 2, 1 1-2, 1, 0 3-2 2-2 1-2
4773,752 4772,913 4772,448 4673,70 4672,75	5 4 3 3 3	10,74 10,74 10,74 10,74 10,74	13,37 13,37 13,37 13,39 13,39	$3p ^{5}P - 7d ^{5}D^{\circ}$ $3p ^{5}P - 7d ^{5}D^{\circ}$ $3p ^{5}P - 7d ^{5}D^{\circ}$ $3p ^{5}P - 9s ^{5}S^{\circ}$ $3p ^{5}P - 9s ^{5}S^{\circ}$	3-4, 3, 2 2-3, 2, 1 1-2, 1, 0 3-2 1, 2-2
4655,359 4654,558 4654,118 4589,89 4588,98	3 2 1 3 2	10,74 10,74 10,74 —	13,40 13,40 13,40 ————————————————————————————————————	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4, 3, 2 2-3, 2, 1 1-2, 1, 0 -

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λ, Å	I	$E_{ m H}$, eV	$E_{ m B}$, eV	Transition	J
4577,66 4576,79 4368,30 4233,32 4222,78	3 2 10 7 5	9,52 12,36 12,36		$-\atop 3s\ {}^3S^\circ -4p\ {}^3P \atop 4p\ {}^3P -3d'\ {}^3P^\circ \atop 4p\ {}^3P -3d'\ {}^3P^\circ$	$\begin{array}{c} -\\ -\\ 1-2, 1, 0\\ 2, 1-2\\ 2, 1, 0-1 \end{array}$
4217,09 3954,596 3954,687 3953,056 3952,982	4 5 10 2 1	12,36 10,99 10,99 10,99 10,99 10,99	15,30 14,12 14,12 14,12 14,12 14,12	$4p\ ^3P - 3d'\ ^3P^\circ \ 3p\ ^3P - 3s''\ ^3P^\circ \ 3p\ ^$	1—0 1—2 2—2 2—1 0—1 1—1
3951,987 3947,594 3947,489 3947,301 3830,26	3 4 7 10	10,99 9,14 9,14 9,14 12,88	14 ,12 12 ,28 12 ,28 12 ,28 16 ,11	$3p \ ^{3}P - 3s'' \ ^{3}P^{\circ}$ $3p \ ^{5}S^{\circ} - 4p \ ^{5}P$ $3p \ ^{5}S^{\circ} - 4p \ ^{5}P$ $3p \ ^{5}S^{\circ} - 4p \ ^{5}P$ $5p \ ^{3}P - 4d' \ ^{3}P^{\circ}$	$ \begin{array}{r} 1-0 \\ 2-1 \\ 2-2 \\ 2-3 \\ 2, 1-2 \end{array} $
3825,530 3825,249 3825,090 3824,425 3823,469	1 4 3 3 10	12,54 12,54 12,54 12,54 12,54 12,54	15 ,78 15 ,78 15 ,78 15 ,78 15 ,78 15 ,78	$3s' \ ^{3}D^{\circ} - 3p'' \ ^{3}D$	1-2 2-3 1-1 2-2 2-1 3-3
3822 ,63 3692 ,44 2883 ,78 2878 ,95 2876 ,30	7 3 2 1	12,54 9,52 10,99 10,99 10,99	15,78 12,88 15,29 15,29 15,30	$3s' ^3D^{\circ} - 3p'' ^3D$ $3s ^3S^{\circ} - 5p ^3P$ $3p ^3P - 3d' ^3P^{\circ}$ $3p ^3P - 3d' ^3P^{\circ}$ $3p ^3P - 3d' ^3P^{\circ}$	$\begin{array}{c} 3-2 \\ 1-2, 1, 0 \\ 2, 1-2 \\ 2, 1, 0-1 \\ 1-0 \end{array}$
1358,524 1355,605 1306,025 1304,866 1302,173	5 2 25 30 30	0,02 0,00 0,03 0,02 0,00	9,14 9,14 9,52 9,52 9,52	$2p^{4} {}^{3}P - 3s {}^{5}S^{\circ}$ $2p^{4} {}^{3}P - 3s {}^{5}S^{\circ}$ $2p^{4} {}^{3}P - 3s {}^{3}S^{\circ}$ $2p^{4} {}^{3}P - 3s {}^{3}S^{\circ}$ $2p^{4} {}^{3}P - 3s {}^{3}S^{\circ}$	1—2 2—2 0—1 1—1 2—1
1217,643 1152,149 1066,660 1048,218 1041,688	2 9 8 1	4,19 1,97 — — 0,03	14,37 12,73 — — 11,93	$2p^{4} {}^{1}S - 3s'' {}^{1}P^{\circ} \\ 2p^{4} {}^{1}D - 3s' {}^{1}D^{\circ} \\ - \\ 2p^{4} {}^{3}P - 4s {}^{3}S^{\circ}$	0—1 2—2 — — 0—1
1040,941 1039,233 1028,162 1027,433 1025,766	15 20 8 20 9	0,02 0,00 0,03 0,02 0,00	11,93 11,93 12,09 12,09 12,09	$2p^4 \ ^3P - 4s \ ^3S^{\circ} \ 2p^4 \ ^3P - 4s \ ^3S^{\circ} \ 2p^4 \ ^3P - 3d \ ^3D^{\circ} \ 2p^4 \ ^3P - 3d^3 \ D^{\circ} \ 2p^4 \ ^3P - 3d^3 \ D^{\circ}$	1-1 2-1 0-1 1-2, 1 2-3, 2, 1
999,493 990,805 990,210 990,132 988,776	2 8 1 15	1,97 0,03 0,02 — 0,00	14,37 12,54 12,54 — 12,54	$2p^{4} ^{1}D - 3s'' ^{1}P^{\circ} \ 2p^{4} ^{3}P - 3s' ^{3}D^{\circ} \ 2p^{4} ^{3}P - 3s' ^{3}D^{\circ} \ - \ 2p^{4} ^{3}P - 3s' ^{3}D^{\circ}$	2-1 0-1 1-1, 2 - 2-3
988,661 988,581 978,616 977,967 976,452	2 3 4 1 5	0,00 0,00 0,03 0,02 0,00	12,54 12,54 12,70 12,70 12,70	$2p^4 \ ^3P - 3s' \ ^3D^{\circ} \ 2p^4 \ ^3P - 3s' \ ^3D^{\circ} \ 2p^4 \ ^3P - 5s \ ^3S^{\circ} \ 2p^4 \ ^3P - 5s \ ^3S^{\circ} \ 2p^4 \ ^3P - 5s \ ^3S^{\circ}$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 0-1 \\ 1-1 \\ 2-1 \end{array} $
973,884 973,240 971,741 952,940 952,414 950,888	4 5 8 4 8	0,03 0,02 0,00 0,03 0,02 0,00	12,76 12,76 12,76 13,04 13,04 13,04	$2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^3P - 6s \ ^3S^{\circ}$ $2p^4 \ ^3P - 6s \ ^3S^{\circ}$	0-1 1-2, 1 2-3, 2, 1 0-1 1-1
950,732	-	0,00	13,04 13,07	$2p^4 \ ^3P - 6s \ ^3S^{\circ} \ 2p^4 \ ^3P - 5d \ ^3D^{\circ}$	$\begin{array}{c} 2 - 1 \\ 0 - 1 \end{array}$

λ, Α	I	$E_{ m H}^{},~{ m eV}$	$E_{\mathrm{B}},\;\mathrm{eV}$	Transition	J
950 ,114 948 ,689 939 ,837	0 4 —	0,02 0,00 0,03	13,07 13,07 13,22	$2p^4 \ ^3P - 5d \ ^3D^{\circ} \ 2p^4 \ ^3P - 5d \ ^3D^{\circ} \ 2p^4 \ ^3P - 7s \ ^3S^{\circ}$	1-2, 1 2-3, 2, 1 0-1
939 ,237 938 ,621 938 ,022 937 ,841 936 ,630	_ _ _ 3 3	0,02 0,03 0,02 0,00 0,00	13,22 13,24 13,24 13,22 13,24	$2p^4 \ ^3P - 7s \ ^3S^{\circ} \ 2p^4 \ ^3P - 6d \ ^3D^{\circ} \ 2p^4 \ ^3P - 6d \ ^3D^{\circ} \ 2p^4 \ ^3P - 7s \ ^3S^{\circ} \ 2p^4 \ ^3P - 6d \ ^3D^{\circ}$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 1-2, 1 \\ 2-1 \\ 2-3, 2, 1 \end{array} $
935,183 931,479 930,889 929,517 922,011	<u>4</u> _ _ _	1,97 0,03 0,02 0,00 1,97	15,22 13,34 13,34 13,34 15,41	$2p^{4} ^{1}D - 4s' ^{1}D^{\circ}$ $2p^{4} ^{3}P - 7d ^{3}D^{\circ}$ $2p^{4} ^{3}P - 7d ^{3}D^{\circ}$ $2p^{4} ^{3}P - 7d ^{3}D^{\circ}$ $2p^{4} ^{1}D - 3d' ^{1}F^{\circ}$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-2, 1 \\ 2-3, 2, 1 \\ 2-3 \end{array} $
882,88 879,553 879,408 879,079 879,027	1 1 1 1	1,94 0,03 0,02 0,02	16,01 14,12 14,12 14,12	$2p^{4} ^{1}D - 5s' ^{1}D^{\circ}$ $2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$ $-$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-1 \\ 1-2 \\ - \end{array} $
878,979 877,885 877,804 861,63 850,74	1 2 2 —	0,02 0,00 0,00 1,97 1,97	14,12 14,12 14,12 16,36 16,54	$2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^1D - 6s' \ ^1D^\circ \ 2p^4 \ ^1D - 7s' \ ^1D^\circ \ $	$ \begin{array}{c} 1 - 0 \\ 2 - 2 \\ 2 - 1 \\ 2 - 2 \\ 2 - 2 \end{array} $
812,158 812,096 811,710 811,501 811,052	- 3 1 1 4	0,03 0,02 0,02 0,02 0,00	15,29 15,29 15,29 15,30 15,29	$2p^4 \ ^3P - 3d' \ ^3P^\circ \ 2p^4 \ ^3P - 3d' \ ^3P^\circ \ $	0-1 $1-2$ $1-1$ $1-0$ $2-2$
810,667 792,971 792,937 792,510 792,237	$\frac{\frac{1}{3}}{\frac{1}{1}}$	0,00 0,02 0,03 0,02 0,02	15,29 15,65 15,66 15,66 15,67	$\begin{array}{c} 2p^4 \ ^3P - 3d' \ ^3P^\circ \\ 2p^4 \ ^3P - 2p^5 \ ^3P^\circ \end{array}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 0-1 \\ 1-1 \\ 1-0 \end{array} $
791,976 791,516 770,698 770,350 770,294	$\frac{3}{1}$ $\frac{0}{1}$	0,00 0,00 0,03 0,02 0,02	15,65 15,66 16,11 16,11	$2p^{4} ^{3}P - 2p^{5} ^{3}P^{\circ} \ 2p^{4} ^{3}P - 2p^{5} ^{3}P^{\circ} \ 2p^{4} ^{3}P - 4d' ^{3}P^{\circ} \ 2p^{4} ^{3}P - 4d' ^{3}P^{\circ} \ 2p^{4} ^{3}P - 4d' ^{3}P^{\circ}$	2—2 2—1 0—1 1—2 1—1
770,264 769,411 769,355 756,7 755,8	1 1 1 1 2	0,02 0,00 0,00 0,02 0,00	16,11 16,11 16,11 16,40 16,40	$2p^4 \ ^3P - 4d' \ ^3P^\circ \ 2p^4 \ ^3P - 4d' \ ^3P^\circ \ 2p^4 \ ^3P - 4d' \ ^3P^\circ \ 2p^4 \ ^3P - 5d' \ ^3P^\circ \ 2p^4 \ ^3P - 5d' \ ^3P^\circ \ $	1—0 2—2 2—1 1—2, 1, 0 2—2, 1
749 ,3 748 ,4	1	0,02 0,00	16,56 16,56	$\frac{2p^4}{2p^4} \frac{^3P}{^3P} - 6d' \frac{^3P}{^3P} $	$\begin{array}{c} 1-2 \ , \ 1 \\ 2-2 \ , \ 1 \end{array}$

O II, ground state $1s^2 \, 2s^2 \, 2p^{3} \, ^4S^0_{3/2}$ Ionization potential 283550,9 cm $^{-1}$; 35,146 eV

λ, λ	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
6910 ,75 6908 ,11 6906 ,54	3 2 4	28,68 28,67 28,69	30,48 30,47 30,49	$3d\ ^4F$ $-4p\ ^4D^{\circ}$ $3d\ ^4F$ $-4p\ ^4D^{\circ}$ $3d\ ^4F$ $-4p\ ^4D^{\circ}$	$\frac{5}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{1}{2}$ $\frac{7}{2} - \frac{5}{2}$

		1	1	
I	E _H , eV	$E_{\rm B}$, eV	Transition	J
5 1	28,70 28,67	30 ,50 30 ,48	3d 4F—4p 4D° 3d 4F—4p 4D°	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
1 1 5 0 1	28,68 28,69 23,44 28,95 28,94	30;49 30,50 25,28 30,81 30,80	3d 4F-4p 4D° 3d 4F-4p 4D° 3s 2P-3p 2S° 3d 2P-4p 2P° 3d 2P-4p 2P°	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
4 3 5 3 2	23,42 28,94 26,56 26,55 26,56	25,28 30,81 28,94 28,94 28,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \end{array}$
4 3 7 5 6	26,55 26,56 26,56 26,55 26,30	28,95 29,06 29,07 29,06 28,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
5 4 5 3 3	26,30 26,30 28,83 26,30 28,82	28,83 28,84 31,37 28,85 31,37	$3p \ ^{4}S^{\circ} - 3d \ ^{4}P$ $3p \ ^{4}S^{\circ} - 3d \ ^{4}P$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $3p \ ^{4}S^{\circ} - 3d \ ^{4}D$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2 2 1 0 1	26,30 26,30 26,30 31,69 31,69	28 ,85 28 ,85 28 ,86 34 ,25 34 ,25	$3p \ ^{4}S^{\circ} - 3d \ ^{4}D$ $3p \ ^{4}S^{\circ} - 3d \ ^{4}D$ $3p \ ^{4}S^{\circ} - 3d \ ^{2}F$ $3d' \ ^{2}S - 4f' \ ^{2}P^{\circ}$ $3d' \ ^{2}S - 4f' \ ^{2}P^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$, $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$, $\frac{3}{2}$
2 4 3 5 0	26,25 26,25 26,25 26,22 29,07	28,85 28,86 28,86 28,85 31,70	$3p \ ^{2}D^{\circ} - 3d \ ^{4}D$ $3p \ ^{2}D^{\circ} - 3d \ ^{4}D$ $3p \ ^{2}D^{\circ} - 3d \ ^{2}F$ $3p \ ^{2}D^{\circ} - 3d \ ^{4}D$ $3d \ ^{2}D \ - 4f \ ^{2}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8 3 0 2 7 {	26,25 28,51 28,83 28,83 26,22 28,51	28 ,88 31 ,15 31 ,46 31 ,46 28 ,86 31 ,15	$3p \ ^2D^{\circ} - 3d \ ^2F$ $3p' \ ^2D^{\circ} - 3d' \ ^2F$ $3p' \ ^2P^{\circ} - 3d' \ ^2P$ $3p' \ ^2P^{\circ} - 3d' \ ^2P$ $3p \ ^2D^{\circ} - 3d \ ^2F$ $3p' \ ^2D^{\circ} - 3d' \ ^2F$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
3 1 2 1 0	28,51 28,51 23,00 28,82 28,82	31,15 31,15 25,64 31,46 31,46	$3p' \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $3s \ ^{4}P - 3p \ ^{4}D^{\circ}$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}P$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
0	29,07 23,00 22,98 29,06 29,06	31,72 25,65 25,63 31,71 31,71	$3d^{2}D-4f^{2}G^{\circ}$ $3s^{4}P-3p^{4}D^{\circ}$ $3s^{4}P-3p^{4}D^{\circ}$ $3d^{2}D-4f^{2}D^{\circ}$ $3d^{2}D-4f^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 7 \\ 5/2 - 5/2 \\ 5/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
6 10 9	23 ,00 22 ,98	25,64 25,63 25,66 25,65 25,64	$3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$ $3s ^4P - 3p ^4D^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{-7}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
1 0 3	29,07 29,07 29,06	31 ,75 31 ,75 31 ,75	$3d^{2}D-4f^{4}F^{\circ}$ $3d^{2}D-4f^{4}F^{\circ}$ $3d^{2}D-4f^{2}F^{\circ}$ $3d^{2}D-4f^{4}F^{\circ}$ $3d^{2}D-4f^{2}F^{\circ}$	5/2 - 5/2 $ 5/2 - 7/2 $ $ 5/2 - 5/2 $ $ 3/2 - 5/2 $ $ 5/2 - 7/2$
	51 11501 43532 43756 54533 22101 24350 8302 7 31210 08400 96096 0103	5 28,70 1 28,67 1 28,68 1 28,69 5 23,44 0 28,95 1 28,94 4 23,42 3 28,94 5 26,56 3 26,55 2 26,56 4 26,55 3 26,56 7 26,56 5 26,30 5 26,30 5 26,30 5 28,83 3 26,30 5 28,83 3 26,30 1 26,25 3 26,25 5 26,25 5 26,22 0 29,07 8 26,25 5 26,25 6 22,96 0 29,06 0 29,07 1 29,07 0 29,06	5 28,70 30,50 1 28,67 30,48 1 28,68 30,49 1 28,69 30,50 5 23,44 25,28 0 28,95 30,81 1 28,94 30,80 4 23,42 25,28 3 28,94 30,81 5 26,56 28,94 2 26,56 28,94 2 26,56 28,95 4 26,55 28,94 2 26,56 29,06 7 26,56 29,06 7 26,56 29,06 6 26,30 28,82 5 26,30 28,83 4 26,30 28,84 5 28,83 31,37 3 26,30 28,85 3 28,82 31,37 2 26,30 28,85 1 26,30 28,85 2 26,30 28,85 1 26,30 28,85 2 26,30 28,85 1 26,25 28,86 3 1,69 34,25 2 26,25 28,86 3 26,56 3 26,25 28,86 3 26,56 3 26,56 3 26,56 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
4602 ,11 4596 ,174 4590 ,971 4506 ,50	2 8 9	29,06 25,66 25,66	31 ,75 28 ,36 28 ,36	3d ² D-4f ² F° 3s' ² D-3p' ² F° 3s' ² D-3p' ² F°	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 7/2$
4491,25	$\frac{2}{3}$	28,94	31,70	$3d$ 2P — $4f$ 2D $^\circ$	$^{3}/_{2}$ — $^{5}/_{2}$
4489,48 4488,17 4488,09 4487,72 4477,88	1 2 2 0 2	28,95 31,46 31,46 31,46 28,94	31,71 34,23 34,23 34,23 31,77	3d ² P-4f ² D° 3d' ² P-4f' ² D° 3d' ² P-4f' ² D° 3d' ² P-4f' ² D° 3d ² P-4f ⁴ G°	$\begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 3/_2, & 5/_2 \\ 3/_2 - 3/_2, & 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \end{array}$
4476,08 4469,41 4469,32 4467,88 4466,32	0 4 3 4 2	28,95 30,42 28,83 30,42 28,94	31,73 33,20 31,60 33,20 31,71	$3d^{2}P-4f^{4}D^{\circ}$ $3s'''^{6}S^{\circ}-3p'''^{6}P$ $3p'^{2}P^{\circ}-4d^{4}D$ $3s'''^{6}S^{\circ}-3p'''^{6}P$ $3d^{2}P-4f^{4}D^{\circ}$	1/2 - 3/2 $5/2 - 3/2$ $3/2 - 3/2$, $5/2$ $5/2 - 5/2$ $3/2 - 5/2$
4466,28 4465,40 4452,377 4448,21 4443,05	4 4 6 6 5	28,94 30,42 23,44 28,36 28,36	31,73 33,20 26,22 31,15 31,15	$3d^{2}P-4f^{4}D^{\circ}$ $3s'''^{6}S^{\circ}-3p'''^{6}P$ $3sP-3p^{2}D^{\circ}$ $3p'^{2}F^{\circ}-3d'^{2}F$ $3p'^{2}F^{\circ}-3d'^{2}F$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 3/2$ $7/2 - 7/2$ $5/2 - 5/2$
4416,972 4414,909 4414,37 4406,02 4395,95	8 10 1 1 7	23,42 23,44 28,83 26,25 26,25	26,22 26,25 31,64 29,06 29,07	$3s^{2}P-3p^{2}D^{\circ} \ 3s^{2}P-3p^{2}D^{\circ} \ 3p'^{2}P^{\circ}-4d^{2}P \ 3p^{2}D^{\circ}-3d^{2}D \ 3p^{2}D^{\circ}-3d^{2}D$	1/2 - 3/2 $3/2 - 5/2$ $3/2 - 3/2$ $5/2 - 3/2$ $5/2 - 5/2$
4379,55 4378,41 4378,01 4371,65 4369,28	3 0 0 2 4	31,37 31,37 28,88 26,22	34,20 34,20 31,72 29,06	$3d' \ ^2D - 4f' \ ^2F^\circ \ 3d' \ ^2D - 4f' \ ^2F^\circ \ 3d \ ^2F - 4f \ ^4G^\circ \ 3p \ ^2D^\circ - 3d \ ^2D \cdot -$	$ \begin{array}{c}$
4366,896 4359,38 4358,40	7 1 0	23,00 26,23 28,86 (28,85	25,84 29,07 31,70 31,70	$3s ^4P - 3p ^4P^{\circ} \ 3p ^2D^{\circ} - 3d ^2D - 3d ^4D - 4f ^4D^{\circ} \ 3d ^4D - 4f ^4D^{\circ}$	$ \begin{array}{r} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
4357,25	0	₹ 28,85 ₹ 25,85	$\begin{array}{c} 31,71 \\ 28,69 \end{array}$	$3d ^4D - 4f ^4D^{\circ}$ $3p ^4P^{\circ} - 3d ^4F$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
4353,60 4351,269	1 6	28,86 $25,66$	31,71 28,51	3d ² F-4f ⁴ G° 3s' ² D-3p' ² D° ~	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{5}{2}$ $\frac{-5}{2}$
4349 ,426 4347 ,425 4345 ,562 4344 ,42	8 6 7 0	23,00 25,66 22,98 28,85	25,85 28,51 25,83 31,71	$3s \stackrel{4}{4}P - 3p \stackrel{4}{4}P^{\circ}$ $3s' \stackrel{2}{2}D - 3p' \stackrel{2}{2}D^{\circ}$ $3s \stackrel{4}{4}P - 3p \stackrel{4}{4}P^{\circ}$ $3d \stackrel{4}{4}D - 4f \stackrel{4}{4}G^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
4343,36 4342,83 4342,00 4340,36 4336,865	0 1 4 2 6	28,86 31,37 31,37 28,88 28,86 22,98	31,71 34,23 34,23 31,74 31,72 25,84	$3d^{2}F-4f^{4}D^{\circ}$ $3d'^{2}D-4f'^{2}D^{\circ}$ $3d'^{2}D-4f'^{2}D^{\circ}$ $3d^{2}F-4f^{2}G^{\circ}$ $3d^{2}F-4f^{2}G^{\circ}$ $3d^{2}F-4f^{2}G^{\circ}$ $3s^{4}P-3p^{4}P^{\circ}$	$\begin{array}{c} {}^{5}/_{2} - {}^{5}/_{2} \\ {}^{5}/_{2} - {}^{3}/_{2}, {}^{5}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2}, {}^{5}/_{2} \\ {}^{7}/_{2} - {}^{9}/_{2} \\ {}^{5}/_{2} - {}^{7}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2} \end{array}$
4334 ,29	0	$\left\{\begin{array}{c} 28,85\\ 28,86\\ \end{array}\right.$	31 ,71 31 ,71	$3d \ ^4D - 4f \ ^2D^{\circ}$ $3d \ ^4D - 4f \ ^2D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
4332,76 4331,89 4331,47 4331,13	$\begin{array}{c} 1 \\ 2 \\ 0 \end{array}$	28,85 28,86 28,51 28,51 28,85 28,85	31,71 31,72 31,37 31,37 31,72 31,73	$\begin{array}{c} 3d \ ^4D-4f \ ^4D^{\circ} \\ 3d \ ^4D-4f \ ^4G^{\circ} \\ 3p' \ ^2D^{\circ}-3d \ ^2D \\ 3p' \ ^2D^{\circ}-3d' \ ^2D \\ 3d \ ^4D-4f \ ^4G^{\circ} \\ 3d \ ^2F-4f \ ^4D^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
4328 ,62 4327 ,89 4327 ,48	$\begin{array}{c} 2 \\ 0 \\ 3 \end{array}$	28,83 28,51 28,51	31 ,69 31 ,37 31 ,37	$3p' \ ^{2}P^{\circ} - 3d' \ ^{2}S$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$	$\begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array}$

					
λ, Å	I	$E_{ m H}$, eV	E_{B} , eV	Transition	J
4325 ,77 4319 ,93	3	22 ,96 28 ,82	25,83 31,69	3s ⁴ P-3p ⁴ P° 3p′ ² P°-3d′ ² S	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
4319 ,631 4317 ,65	8 0	22,98 28,83	25,85 31,70	$3s ^{4}P - 3p ^{4}P^{\circ}$ $3d ^{4}P - 4f ^{2}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
4317,139 4315,80	$\frac{8}{00}$	22,96 22,88 28,88	25 ,84 31 ,75 31 ,75	3s ⁴ P—3p ⁴ P° 3d ² F—4f ⁴ F° 3d ⁴ D—4f ⁴ F°	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
4315 ,35	0	$ \begin{cases} 28,85 \\ 28,85 \end{cases} $	31,73 31,73	$3d\ ^4D - 4f\ ^4D^{\circ} \ 3d\ ^4D - 4f\ ^4D^{\circ}$	$\frac{3}{2} \frac{1}{2} \frac{1}{2}$ $\frac{1}{2} \frac{3}{2} \frac{3}{2}$
4313 ,43 4312 ,10	1 0	28 ,88 28 ,88	31,75 31,76	$3d^{2}F - 4f^{4}F^{\circ}$ $3d^{2}F - 4f^{2}F^{\circ}$	⁷ / ₂ — ⁹ / ₂ ⁷ / ₂ — ⁷ / ₂
4308 ,96 4307 ,31 4305 ,53	1 1 0	28,85 28,84 28,83	31 ,73 31 ,71 31 ,71	$3d^{4}D-4f^{4}D^{\circ} \ 3d^{4}P-4f^{2}D^{\circ} \ 3d^{4}P-4f^{4}G^{\circ}$	$^{1/2}_{2}$ $^{1/2}_{2}$ $^{1/2}_{2}$ $^{3/2}_{2}$ $^{5/2}$
4303 ,82 4303 ,06	$\frac{5}{0}$	28,82 31,32	31,70 34,20	$\frac{3d}{3}\frac{^{4}P-4f}{^{4}D^{\circ}}$ $\frac{3d'}{^{2}G-4f'}\frac{^{2}G^{\circ}}{^{2}G^{\circ}}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
4302 ,81 4294 ,82 4292 ,23	$\begin{matrix} 0 \\ 3 \\ 0 \end{matrix}$	31 ,32 28 ,83 28 ,86	34,20 31,71 31,75	$3d' \ ^2G-4f' \ ^2G^{\circ} \ 3d \ ^4P-4f \ ^4D^{\circ} \ 3d \ ^2F-4f \ ^4F^{\circ}$	$\frac{9}{2}$ $\frac{7}{2}$, $\frac{9}{2}$ $\frac{9}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4291 ,25 4288 ,83 4285 ,70	1 1 3	28,82 28,84	31,71 31,73	3d ⁴ P-4f ⁴ G° 3d ⁴ P-4f ⁴ D°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
4283,70 4283,75 4283,13	0 0	28 ,86 28 ,86 28 ,86	31 ,75 31 ,75 31 ,75	$3d^{2}F-4f^{4}F^{\circ} \ 3d^{4}D-4f^{4}F^{\circ} \ 3d^{4}D-4f^{4}F^{\circ}$	$\begin{array}{c} {}^{5/2} - {}^{7/2} \\ {}^{3/2} - {}^{3/2} \\ {}^{5/2} - {}^{5/2} \end{array}$
4282 ,96 4282 ,82	1 0	28,86 28,83	31,75 31,73	3d ⁴ D-4f ⁴ F° 3d ⁴ P-4f ⁴ D°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
4281 ,40 4281 ,25 4277 ,90	0 0 1	·28 ,82 28 ,82 28 ,66	31,71 31,73 31,75	$3d \ ^4P-4f \ ^4D^{\circ} \ 3d \ ^4P-4f \ ^4P^{\circ} \ 3d \ ^4D-4f \ ^4F^{\circ}$	$\frac{5}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{3}{2}$ $\frac{7}{2} - \frac{7}{2}$
4277,40	1	28,86 28,85	31 ,75 31 ,75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
4276 ,71 4276 ,64	1 3	28,85 28,83 28,86	31,75 31,73 31,75	3d ⁴ D-4f ⁴ F° 3d ⁴ P-4f ⁴ D° 3d ⁴ D-4f ⁴ F°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
4276 ,21 4275 ,90	0	28 ,85 28 ,86	31,75 31,75	$\begin{array}{c} 3d \ ^4D - 4f \ ^2F^{\circ} \\ 3d \ ^4D - 4f \ ^2F^{\circ} \end{array}$	$ \begin{array}{r} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4275 ,52 4274 ,13 4273 ,17	4 00	28,86 28,86	31,76 31,75	3d ⁴ D - 4f ⁴ F° 3d ⁴ D - 4f ² F°	7/2—9/2 7/2—7/2
4273,17 4253,98 4253,74	0 4 4	31,32	31 ,75 34 ,23 34 ,23	3d 4D—4f 2F° 3d' 2G—4f' 2H° 3d' 2G—4f' 2H°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4196 ,72 4196 ,26	00	28,51 28,51	31 ,46 31 ,46	$3p' ^2D^{\circ} - 3d' ^2P$ $3p' ^2D^{\circ} - 3d' ^2P$	$\frac{3}{2} - \frac{1}{2}, \frac{3}{2} - \frac{1}{2}$ $\frac{3}{2} - \frac{3}{2} - \frac{3}{2}$
4192,50 4189,788 4185,456	2 10 8	28 ,51 28 ,36	31,46 31,32 31,32	$3p' \ ^{2}D^{\circ} - 3d' \ ^{2}P$ $3p' \ ^{2}F^{\circ} - 3d' \ ^{2}G$ $3p' \ ^{2}F^{\circ} - 3d' \ ^{2}G$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4169 ,230 4156 ,54 4153 ,302	$\frac{4}{3}$	25,85	28 ,82 28 ,83	3p 4P°—3d 4P 3p 4P°—3d 4P	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
4146 ,09 4145 ,90	7 3 0	33,20 :	28 ,82 36 ,19 36 ,19	$3p ^4P^{\circ} - 3d ^4P$ $3p''' ^6P - 3d''' ^6D^{\circ}$ $3p''' ^6P - 3d''' ^6D^{\circ}$	$\frac{3/2}{5/2}$ $\frac{5/2}{7/2}$ $\frac{7/2}{7/2}$ $\frac{9}{2}$ $\frac{7}{2}$
4143,77 4143,52 4142,24	2 1 0	33,20 3	36,19 36,19	3p''' 6P—3d''' 6D° 3p''' 6P—3d''' 6D°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4142,24 4142,08 4141,96	1	33,20	36 ,19 36 ,19 36 ,19	$3p''' \ ^{6}P - 3d''' \ ^{6}D^{\circ}$ $3p''' \ ^{6}P - 3d''' \ ^{6}D^{\circ}$ $3p''' \ ^{6}P - 3d''' \ ^{6}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
4140,76 4132,806	0 7	25,83 2 25,83 2	8,83 8,83	$\frac{3p}{3p}\frac{4P}{4P}$ $\frac{3d}{4P}$ $\frac{4P}{3p}\frac{4P}{4P}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
4129 ,34 148	2	25 ,84 2	8 ,84	$3p \ ^4P^{\circ} - 3d \ ^4P$	$\frac{1}{2} \frac{3}{2} \frac{3}{2}$

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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
4121 ,48 4120 ,554	4 2	25 ,83 25 ,85	28 ,84 28 ,86	3p 4P°—3d 4P 3p 4P°—3d 4D	$^{1/2}_{5/2}$ $^{1/2}_{2}$
4120 ,279 4119 ,221	3 8	25 ,85 25 ,85	28,86	3p 4P°—3d 4D 3p 4P°—3d 4D	5/2—5/2 5/2—7/
4113,82	1	25,85 25,36	28 ,86 31 ,37	$3p' {}^{2}F^{\circ} - 3d' {}^{2}D$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
4112,029 4110,795	4 3	25,85 $25,84$	28 ,86 28 ,85	3p 4P°—3d 2F 3p 4P°—3d 4D	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{-1}{2}$
4110,20	1	28,36	31 ,37	$3p' {}^{2}F^{\circ} - 3d' {}^{2}D$	⁵ /2 ⁻³ /2
4108 ,75 4107 ,07	0 1	28,69 28,68	31 ,71 31 ,70	$3d$ 4F — $4f$ 4G ° $3d$ 4F — $4f$ 4D °	7/2-7/2
4106 ,03	0	25,66	28 ,68	$3p ^4D^{\circ} - 3d ^4F$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
4105,000	7	25 ,84	28 ,86	$3p ^4P^{\circ} - 3d ^4D$	3/2-3/2
4104,743 4103,017	5 5	25 ,84 25 ,83	28 ,86 28 ,85	3p 4P°—3d 4D 3p 4P°—3d 4D	$\frac{3}{2}$ - $\frac{5}{2}$ $\frac{1}{2}$ - $\frac{1}{2}$
4098 ,27	0	28 ,67 28 ,69	31 ,70 31 ,72	3d 4F—4f 2D° 3d 4F—4f 4G°	$\frac{3/2}{7/2}$ $\frac{5/2}{9/2}$
4097,260	4	25 ,83	28 ,86	$3p ^4P^{\circ} - 3d ^4D$	$^{1}/_{2}$ — $^{3}/_{2}$
4096 ,543 4096 ,1 8	3 0	25,84 28,68	28 ,86 31 ,71	$3p 4P^{\circ} - 3d 2F$ $3d 4F - 4f 4G^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
63, 4095	0	28 ,68	31,71	$3d {}^{4}F - 4f {}^{4}G^{\circ}$	$^{5}/_{2}^{-}$ $^{7}/_{2}^{-}$
4094 ,18 4092 ,940	0 8	25,65 25,66	28 ,68 28 ,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
4089,295	4	28 ,70	31 ,73	$3d ^4F - 4f ^4G^{\circ}$	$9/_2$ —11 $/_2$
4087 ,16 4085 ,124	$\frac{2}{3}$	28,68 25,65	31 ,71 28 ,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4084 ,66 4083 ,907	1 2	25,85 28,68	28,88 31,72	$\frac{3p}{3d} \frac{4P}{4F} - \frac{3d}{4F} \frac{2F}{4f} \frac{2G}{2G}$	$^{5/2}$ $^{-7/2}$
4078,862	$\frac{2}{4}$	25,64	28,68	$3p^{4}D^{\circ}-3d^{4}F$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
4075 ,868 4072 ,164	10 8	25 ,66 25 ,65	28 ,70 28 ,69	3p 4D°—3d 4F 3p 4D°—3d 4F	$\frac{7}{2}$ $\frac{9}{2}$
4071,20	0	69, 28	31 ,74	$3d \ ^4F-4f \ ^2G^{\circ}$	$\frac{5/2 - 7/2}{7/2 - 9/2}$ $\frac{3}{2 - 5/2}$
4069 ,897 4069 ,634	6 4	25 ,64 25 ,63	28 ,68 28 ,68	3p 4D°—3d 4F 3p 4D°—3d 4F	$^{3/2}_{1/2}$
4062,90	1	28,70	31,75	3d 4F-4f 4F°	9/2-9/2
4061 ,00 4060 ,98	$\frac{2}{2}$	31,15 31,15	34,20 34,20	$\frac{3d'}{3d'} \frac{{}^{2}F-4f'}{{}^{2}G^{\circ}} = \frac{3d'}{3d'} \frac{{}^{2}F-4f'}{{$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
4060,58 4054,55	$\frac{3}{00}$	31 ,15 31 ,15	34,20 34,20	$\frac{3d'}{3d'}\frac{2F}{2F}$ $\frac{4f'}{2F}$ $\frac{2G^{\circ}}{2F}$	$\frac{\frac{7}{2}-\frac{9}{2}}{\frac{5}{2}-\frac{5}{2}}$
4054,10	0 {	31 ,15	34,20	3d' 2F-4f' 2F°	7/2—7/2 7/2—7/2
4048 ,22	1	28 ,69 28 ,70	31 ,75 31 ,76	3d ⁴ F—4f ⁴ F° 3d ⁴ F—4f ⁴ F°	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
4046 ,15 4044 ,96	00	28 ,69	31,76	$3d ^4F$ — $4f ^4F^{\circ}$	$^{7/2}$ $^{-9/2}$
4041 ,31	0	28,69 28,68	31,75 31,75	3d 4F—4f 2F° 3d 4F—4f 4F°	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4035 ,09 4033 ,18	0	28,68 28,67	31 ,75 31 ,75	$3d^{4}F - 4f^{2}F^{\circ}$	$\frac{5}{2}$ $\frac{-5}{2}$
4026 ,40	0	28 ,67	31 ,75	$3d$ 4F — $4f$ 4F ° $3d$ 4F — $4f$ 2F °	$^{3/}_{2}$ $^{-3/}_{2}$ $^{3/}_{2}$ $^{-5/}_{2}$
4024 ,04 3985 ,46	1 O	31,15 25,83	34,23 28,94	$\frac{3d'}{3p} \frac{{}^{2}F}{{}^{4}P} \stackrel{\checkmark}{-} \frac{3d}{3p} \frac{{}^{2}P}{{}^{2}P}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
3982,719	5	23,44	26,55	$3s ^2P - 3p ^2P^{\circ}$	$^{3}/_{2}$ — $^{1}/_{2}$
3973 ,263 3967 ,441	10 1	23,44 25,83	26 ,56 28 ,95	$3s {}^{2}P - 3p {}^{2}P^{\circ} \ 3p {}^{4}P^{\circ} - 3d {}^{2}P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
3963 ,13 3954 ,372	0 7	28,51 23,42	31,64 26,55	$3p' 2D^{\circ} - 4d 2P$ $3s 2P - 3p 2P^{\circ}$	$\frac{\frac{5}{2}-\frac{3}{2}}{\frac{1}{2}-\frac{1}{2}}$
3945,048	5	23,42	26,56	$3s ^{2}P - 3_{D} ^{2}P^{\circ}$	$^{1}/_{2}$ — $^{3}/_{2}$
3926 ,58 3919 ,287	6	25 ,66 25 ,66	28 ,82 28 ,82	$\frac{3p}{3s'} \frac{^4D^{\circ} - 3d}{^2P} \frac{^4P}{^2P^{\circ}}$	$\frac{7}{2}$ _{2}_{3/2}^{5/2}
3912 ,088 3911 ,960	2	25 ,66 25 ,66	28,83	$3s' {}^{2}D - 3p' {}^{2}P^{\circ}$	$^{3}/_{2}$ — $^{3}/_{2}$
3011,000	10	20,00	28,83	$3s' ^2D - 3p' ^2P^\circ$	$\frac{5}{2}$ $\frac{3}{2}$

λ, Å	I	$E_{ m H}^{},\;{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
3907,45 3896,30 3893,53 3883,15 3882,45	4 1 2 3 1	25,65 25,65 25,64 25,66 25,64	28 ,83 28 ,83 28 ,82 28 ,85 28 ,83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3882,197 3875,82 3874,10 3872,45 3864,68	7 4 2 1	25,66 25,66 25,63 25,64 25,65	28,86 28,86 28,83 28,84 28,85	$3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^2F$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4P$	$7/_{2}$ $7/_{2}$ $7/_{2}$ $5/_{2}$ $1/_{2}$ $3/_{2}$ $1/_{2}$ $5/_{2}$ $3/_{2}$ $1/_{2}$
3864,45 3864,13 3863,50 3857,18 3856,16	1 7 2 4 5	25,65 25,63 25,65 25,65 25,64	28,85 28,84 28,86 28,86 28,85	$3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^2F$ $3p ^4D^{\circ} - 3d ^4D$	$ \begin{array}{c} 5/_2 - \frac{5}{2} \\ 1/_2 - \frac{1}{2} \\ 5/_2 - \frac{7}{2} \\ 5/_2 - \frac{5}{2} \\ 3/_2 - \frac{1}{2} \end{array} $
3851,47 3851,04 3850,81 3847,89 3843,58	0 3 2 3 3	25,66 25,64 25,64 25,63 25,64	28,88 28,86 28,86 28,85 28,86	3p 4D°-3d 2F 3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 2F	7/2 - 7/2 $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 1/2$ $3/2 - 5/2$
3842,82 3833,10 3830,45 3821,68 3803,14	3 4 4 6	25,63 25,65 26,56 26,55 26,56	28,86 28,88 29,80 29,80 29,82	$3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^2F$ $3p ^2P^{\circ} - 4s ^2P$ $3p ^2P^{\circ} - 4s ^2P$ $3p ^2P^{\circ} - 4s ^2P$	$\begin{array}{c} {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{5}/_{2} - {}^{7}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2} \end{array}$
3794,48 3785,01 3777,60 3762,63 3749,49	3 0 4 5 9	26,55 30,81 26,30 26,30 23,00	29 ,82 34 ,08 29 ,58 29 ,60 26 ,30	$3p {}^{2}P^{\circ} - 4s {}^{2}P$ $4p {}^{2}P^{\circ} - 4d' {}^{2}D$ $3p {}^{4}S^{\circ} - 4s {}^{4}P$ $3p {}^{4}S^{\circ} - 4s {}^{4}P$ $3s {}^{4}P - 3p {}^{4}S^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3741,69 3739,92 3735,94 3729,34 3727,33	0 6 3 2 8	28,36 26,30 28,83 28,82 22,98	31,67 29,62 32,15 32,15 26,30	$3p' {}^{2}F^{\circ}$ — $4d {}^{2}F$ $3p {}^{4}S^{\circ}$ — $4s {}^{4}P$ $3p' {}^{2}P^{\circ}$ — $4s' {}^{2}D$ $3p' {}^{2}P^{\circ}$ — $4s' {}^{2}D$ $3s {}^{4}P$ — $3p {}^{4}S^{\circ}$	7/2 - 7/2 $3/2 - 5/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$
3712,75 3533,97 3516,92 3506,02 3501,67	7 00 0 0 0	22,96 28,86 28,86 28,85 28,85	26 ,30 32 ,36 32 ,38 32 ,39 32 ,39	$3s ^4P - 3p ^4S^{\circ}$ $3d ^4D - 5p ^4D^{\circ}$ $3d ^4D - 5p ^4P^{\circ}$ $3d ^4D - 5p ^4P^{\circ}$ $3d ^4D - 5p ^4P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3500 ,5 3496 ,27 3495 ,44 3494 ,66 3488 ,18	00 1 0 00 0	28,86 25,28 28,86 28,85 25,28	32,40 28,83 32,40 32,40 28,84	$3d^{2}F - 5p^{4}P^{\circ}$ $3p^{2}S^{\circ} - 3d^{4}P$ $3d^{4}D - 5p^{4}P^{\circ}$ $3d^{4}D - 5p^{4}P^{\circ}$ $3p^{2}S^{\circ} - 3d^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
3474,94 3470,81 3470,42 3459,07 3457,99	1 8 5 0 1	25 ,28 26 ,25 26 ,22 28 ,86 28 ,88	28,85 29,82 29,79 32,44 32,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
3453,31 3447,98 3420,61 3419,87 3409,84	0 1 3 2 6	28,85 26,22 — — 28,51	32,44 29,82 — — 32,45	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3407,38 3390,25	7 8	28 ,51 25 ,28	32 ,15 28 ,94	$\frac{3p'}{3p} \frac{^{2}D^{\circ}}{2^{\circ}S} - \frac{4s'}{3d} \frac{^{2}D}{^{2}P}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
150					

λ, λ	I	E _H , eV	E _B , eV	Transition	J
3377 ,20 3375 ,77	7	25,28 28,69	28 ,95 32 ,36	$3p {}^{2}S^{\circ} - 3d {}^{2}P$ $3d {}^{4}F - 5p {}^{4}D^{\circ}$	$^{1/2}_{7/2}$ $^{-1/2}_{5/2}$
3374 ,77 3371 ,85 3370 ,23 3367 ,00 3360 ,15	00 2 00 00 00	30,81 28,70 28,67 28,68 28,69	34,48 32,38 32,35 32,36 32,38	$4p {}^{2}P^{\circ}-5s' {}^{2}D$ $3d {}^{4}F-5p {}^{4}D^{\circ}$ $3d {}^{4}F-5p {}^{4}D^{\circ}$ $3d {}^{4}F-5p {}^{4}D^{\circ}$ $3d {}^{4}F-5p {}^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
3306,60 3305,15 3301,56 3295,13 3290,13	6 6 3 4 5	25,84 25,85 25,83 25,84 25,83	29,58 29,58 29,59 29,58 29,60	3p 4P°—4s 4P 3p 4P°—4s 4P 3p 4P°—4s 4P 3p 4P°—4s 4P 3p 4P°—4s 4P	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3287,59 3277,69 3273,52 3270,98 3218,10	9 7 7 7 2	25,85 25,84 28,36 28,36 33,20	29,62 29,62 32,15 32,15 37,05	$3p ^4P^{\circ} - 4s ^4P$ $3p ^4P^{\circ} - 4s ^4P$ $3p' ^2F^{\circ} - 4s' ^2D$ $3p'' ^6P - 4s'' ^6S^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
3216,76 3216,08 3169,2 3165,1 3139,77	1 0 1 1 4	33,20 33,20 29,07 29,06 25,64	37,05 37,05 32,98 32,98 29,58	$3p''' 6P - 4s''' 6S^{\circ}$ $3p''' 6P - 4s''' 6S^{\circ}$ $3d ^{2}D - 5f ^{2}F^{\circ}$ $3d ^{2}D - 5f ^{2}F^{\circ}$ $3p ^{4}D^{\circ} - 4s ^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3138,44 3134,82 3134,32 3129,44 3124,02	8 10 3 6 2	25,65 25,66 25,63 25,64 25,63	29,60 29,62 29,58 29,60 29,60	$3p ^4D^{\circ}$ $- 4s ^4P$ $3p ^4D^{\circ}$ $- 4s ^4P$ $3p ^4D^{\circ}$ $- 4s ^4P$ $3p ^4D^{\circ}$ $- 4s ^4P$ $3p ^4D^{\circ}$ $- 4s ^4P$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3122,62 3113,71 3097,52 3081,46 3047,9	6 1 0 2 0	25,65 25,64 28,94 — 28,88	29,62 29,62 32,94 — 32,95	$3p ^4D^{\circ}$ $-4s ^4P$ $3p ^4D^{\circ}$ $-4s ^4P$ $3d ^2P$ $-5f ^4D^{\circ}$ - $3d ^2F$ $-5f ^4G^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3039 ,76 3039 ,51 3032 ,50 3032 ,08 3028 ,82	1 1 1 2 1	28,86 28,85 28,86 28,88 28,88	32,93 32,93 32,95 32,97 32,95	$3d\ ^4D - 5f\ ^4D^{\circ} \ 3d\ ^4D - 5f\ ^4D^{\circ} \ 3d\ ^2F - 5f\ ^2G^{\circ} \ 3d\ ^2F - 5f\ ^2G^{\circ} \ 3d\ ^4D - 5f\ ^4G^{\circ}$	7/2 - 7/2 $5/2 - 7/2$ $5/2 - 7/2$ $5/2 - 9/2$ $7/2 - 9/2$
3025,75 3016,14 3014,50 3013,37 3012,83	1 1 1 3 1	28,88 28,85 28,86 28,82 28,85	32,98 32,96 32,97 32,93 32,97	$3d\ ^2F-5f\ ^4F^\circ \ 3d\ ^4D-5f\ ^4D^\circ \ 3d\ ^2F-5f\ ^4F^\circ \ 3d\ ^4P-5f\ ^4D^\circ \ 3d\ ^4D-5f\ ^4F^\circ \ $	7/2 - 9/2 $1/2 - 1/2$ $5/2 - 5/2$ $5/2 - 7/2$ $5/2 - 5/2$
3009,83 3009,62 3008,83 3008,28 3007,74	1 1 3 1 3	28,85 28,85 28,83 28,86 28,85	32,97 32,97 32,95 32,98 32,98	$3d\ ^4D-5f\ ^4F^\circ$ $3d\ ^4D-5f\ ^4F^\circ$ $3d\ ^4P-5f\ ^4D^\circ$ $3d\ ^4D-5f\ ^4F^\circ$ $3d\ ^4D-5f\ ^4F^\circ$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{5}{2} - \frac{7}{2} $
3007,08 3006,82 3006,01 3005,62	3 3 2 2	28,86 - 28,84	32 ,98 — 32 ,96 —	$3d {}^{4}D - 5f {}^{4}F^{\circ}$ $-3d {}^{4}P - 5f {}^{4}D^{\circ}$	7/ ₂ —9/ ₂ — 1/ ₂ —1/ ₂
3002,93 2997,74 2995,94 2915,65 2911,85	1 2 1 1 2	28,68 28,69	- 32 ,93 32 ,95	3d ⁴ F—5f ⁴ D° 3d ⁴ F—5f ⁴ G°	

λ, Α	I	$E_{ m H}^{}$, eV	E_{B} , eV	Transition	J
2911 ,20 2908 ,74 2906 ,62 2905 ,00 2904 ,29	2 1 3 2 2	28 ,67 28 ,70 28 ,68	32 ,94 32 ,97 32 ,95 —	3d ⁴ F—5f ⁴ G° 3d ⁴ F—5f ⁴ G° 3d ⁴ F—5f ² G°	3/2 $5/2$ $9/2$ $11/2$ $5/2$ $7/2$
2892 ,47 2891 ,88 2887 ,91 2885 ,90 2883 ,96	2 1 3 1 4	28,69 — — —	32,98 — — —	3d 4F—5f 4F° ————————————————————————————————————	7/2—9/2 —————————————————————————————————
2879,04 2836,35 2808,84 2803,11 2783,15	3 2 2 1 2	26,38 26,36 26,38 26,36	30 ,75 30 ,77 30 ,80 30 ,81	$\begin{array}{c} - \\ 2p^4 \ ^2P - 4p \ ^2D^{\circ} \\ 2p^4 \ ^2P - 4p \ ^2D^{\circ} \\ 2p^4 \ ^2P - 4p \ ^2P^{\circ} \\ 2p^4 \ ^2P - 4p \ ^2P^{\circ} \end{array}$	$\begin{array}{c}$
2747,46 2733,34 2718,90 2715,45 2575,433	6 10 3 5 1	25 ,28 25 ,28 — — — 26 ,56	29,79 29,82 — — 31,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2575,300 2571,476 2530,30 2527,03 2526,91	10 8 8 1 7	26,56 26,55 26,25 26,56 26,56	31,37 31,37 31,15 31,46 31,46	$3p \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $2p \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $3p \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $3p \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p \ ^{2}P^{\circ} - 3d' \ ^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
2523 ,20 2523 ,09 2517 ,97 2445 ,55 2444 ,26	1 1 6 10 5	26 ,55 26 ,55 26 ,23 23 ,44 23 ,44	31,46 31,46 31,15 28,51 28,51	$3p \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $3s \ ^{2}P - 3p' \ ^{2}D^{\circ}$ $3s \ ^{2}P - 3p' \ ^{2}D^{\circ}$	1/2 - 1/2 $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$
2441 ,67 2438 ,09 2436 ,06 2433 ,538 2431 ,66	2 1 5 9	26,56 26,55 25,66 23,42 26,55	31,64 31,64 30,75 28,51 31,65	$3p ^{2}P^{\circ}$ — $4d ^{2}P$ $3p ^{2}P^{\circ}$ — $4d ^{2}P$ $3s' ^{2}D$ — $4p ^{2}D^{\circ}$ $3s ^{2}P$ — $3p' ^{2}D^{\circ}$ $3p ^{2}P^{\circ}$ — $4d ^{2}P$	3/2 - 3/2 $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$
2425 ,55 2418 ,60 2418 ,46 2415 ,13 2411 ,60	2 1 7 4 6	25,66 26,25 26,25 26,56 26,55	30 ,77 31 ,37 31 ,37 31 ,69 31 ,69	$3s' ^{2}D - 4p ^{2}D^{\circ}$ $3p ^{2}D^{\circ} - 3d' ^{2}D$ $3p ^{2}D^{\circ} - 3d' ^{2}D$ $3p ^{2}P^{\circ} - 3d' ^{2}S$ $3p ^{2}P^{\circ} - 3d' ^{2}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2407,49 2407,37 2406,41 2375,73 2365,15	6 1 6 4 3	26,23 26,23 25,66 26,25 26,22	31,37 31,37 30,81 31,46 31,46	$3p {}^{2}D^{\circ} - 3d' {}^{2}D$ $3p {}^{2}D^{\circ} - 3d' {}^{2}D$ $3s' {}^{2}D - 4p {}^{2}P^{\circ}$ $3p {}^{2}D^{\circ} - 3d' {}^{2}P$ $3p {}^{2}D^{\circ} - 3d' {}^{2}P$	3/2 - 3/2 $3/2 - 5/2$ $5/2 - 3/2$ $5/2 - 3/2$ $5/2 - 3/2$ $3/2 - 1/2$
2365 ,03 2339 ,31 2331 ,16 2327 ,97 2324 ,83	1 3 0 2 0	26,22 26,30 28,86 26,30 26,30	31,46 31,60 34,20 31,63 31,63	$3p ^2D^{\circ} - 3d' ^2P$ $3p ^4S^{\circ} - 4d ^4D$ $3d ^2F - 4f' ^2G^{\circ}$ $3p ^4S^{\circ} - 4d ^4P$ $3p ^4S^{\circ} - 4d ^4P$	3/2 - 3/2 $3/2 - 3/2$, $5/2$ $7/2 - 7/2$ $3/2 - 3/2$ $3/2 - 1/2$
2322 ,15 2319 ,68 2316 ,79 2316 ,12 2313 ,05	3 4 3 3 3	26,38 26,36 26,38 26,36 26,36	31 ,73 31 ,71 31 ,73 31 ,71 31 ,73	$2p^4 \ ^2P - 4f \ ^4D^{\circ}$ $2p^4 \ ^2P - 4f \ ^2D^{\circ}$ $2p^4 \ ^2P - 4f \ ^4D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2307,72 2302,83 2300,35	1 5 8	26 ,36 23 ,44 23 ,44	31 ,73 28 ,82 28 ,83	$2p^4 \ ^2P - 4f \ ^4D^{\circ}$ $3s \ ^2P - 3p' \ ^3P^{\circ}$ $3s \ ^2P - 3p' \ ^2P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

					
λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
2293 ,32 2290 ,88	6 6	23 ,42 23 ,42	28 ,82 28 ,83	$\frac{3s}{3s} \frac{^{2}P}{^{2}P} - \frac{3p'}{^{2}P} \frac{^{2}P}{^{\circ}}$	$^{1/_{2}-1/_{2}}_{^{1/_{2}-3/_{2}}}$
2284 ,89 2283 ,42 2262 ,80 2259 ,66 2252 ,90	3 3 1 2 3	26,25 26,22 26,56 26,55 26,56	31 ,67 31 ,65 32 ,04 32 ,04 32 ,06	$3p ^{2}D^{\circ}-4d ^{2}F$ $3p ^{2}D^{\circ}-4d ^{2}F$ $3p ^{2}P^{\circ}-5s ^{2}P$ $3p ^{2}P^{\circ}-5s ^{2}P$ $3p ^{2}P^{\circ}-5s ^{2}P$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
2250,00 2239,89 2229,66 2218,70 2215,67	1 0 0 2 1	26,55 28,51 28,51 26,56 26,55	32,06 34,06 34,07 32,15 32,15	$3p^{2}P^{\circ}-5s^{2}P$ $3p'^{2}D^{\circ}-4d'^{2}F$ $3p'^{2}D^{\circ}-4d'^{2}F$ $3p^{2}P^{\circ}-4s'^{2}D$ $3p^{2}P^{\circ}-4s'^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
2195 ,43 2191 ,44 2190 ,42 2189 ,51	2 2 2 1	26,30 28,83 26,30	31 ,95 34 ,48 31 ,96	$3p {}^{4}S^{\circ} - 5s {}^{4}P$ $3p' {}^{2}P^{\circ} - 5s' {}^{2}D$ $3p {}^{4}S^{\circ} - 5s {}^{4}P$ $-$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ - 3/2 \end{array} $
2189 ,20 2182 ,64 2161 ,65 2160 ,52 2149 ,47 2148 ,23	2 4 0 0 0 0	28 ,82 26 ,30 26 ,25 26 ,22 25 ,84 25 ,85	34,48 31,98 31,98 31,96 31,60 31,60	$3p' \ ^{2}P^{\circ}-5s' \ ^{2}D$ $3p \ ^{4}S^{\circ}-5s \ ^{4}P$ $3p \ ^{2}D^{\circ}-5s \ ^{4}P$ $3p \ ^{2}D^{\circ}-5s \ ^{4}P$ $3p \ ^{4}P^{\circ}-4d \ ^{4}D$ $3p \ ^{4}P^{\circ}-4d \ ^{4}D$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 5/_2 \end{array} $
2131,99 2131,76 2123,39 2101,29 2100,69	4 5 0 4 1	26,22 26,25 26,22 26,25 25,66	32,04 32,06 32,06 32,15 31,56	$3p \ ^2D^{\circ} - 5s \ ^2P$ $3p \ ^2D^{\circ} - 5s \ ^2P$ $3p \ ^2D^{\circ} - 5s \ ^2P$ $3p \ ^2D^{\circ} - 4s' \ ^2D$ $3p \ ^4D^{\circ} - 4d \ ^4F$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \end{array} $
2099,91 2092,90 2074,17 2022,83 2021,45	1 1 1 1	25,65 26,22 28,51 28,36 25,83	31 ,55 32 ,15 34 ,48 34 ,48 31 ,96	$3p \ ^4D^{\circ} - 4d \ ^4F$ $3p \ ^2D^{\circ} - 4s' \ ^2D$ $3p' \ ^2D^{\circ} - 5s' \ ^2D$ $3p' \ ^2F^{\circ} - 5s' \ ^2D$ $3p \ ^4P^{\circ} - 5s \ ^4P$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
2020,44 2016,60 1964,25 1963,84 1962,24	2 2 0 2 3	25,85 25,84 25,64 25,65 25,66	31,98 31,98 31,95 31,96 31,98	$3p ^4P^{\circ} - 5s ^4P$ $3p ^4P^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 5s ^4P$ $3p ^4D^{\circ} - 5s ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
1960 ,34 1957 ,42 932 ,046 919 ,78 834 ,462	1 0 10 15 15	25,64 25,65 — — 0,00	31,96 31,98 — — 14,86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ - \\ 3/2 - 5/2 \end{array} $
833 ,326 832 ,754 796 ,661 750 ,226 749 ,662	15 14 10 2 1	0,00 0,00 5,02	14,88 14,89 20,58 —	$\begin{array}{c} 2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P \\ 2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P \\ 2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}D \\ - \\ - \end{array}$	$^{3/2}_{3/2}$ $^{3/2}_{1/2}$ $^{1/2}_{2}$ $^{3/2}_{2}$ $^{5/2}_{2}$ $^{5/2}_{2}$
741,293 740,838 739,949 718,562 718,484	00 0 1 16 17	14,89 14,88 14,86 3,33 3,32	31,61 31,61 31,61 20,58 20,58	$3p^4 ^4P - 3s''' ^4S^{\circ} \ 2p^4 ^4P - 3s''' ^4S^{\circ} \ 2p^4 ^4P - 3s''' ^4S^{\circ} \ 2p^3 ^2D^{\circ} - 2p^4 ^2D \ 2p^3 ^2D^{\circ} - 2p^4 ^2D$	$\begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ , & 5/_2 \end{array}$
673,768 672,948 644,148 617,051 616,363	7 8 12 6 4	5,02 5,02 5,02 3,33 3,33	23,42 23,44 24,26 23,42 23,44	$2p^{3} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 2p^{4}$ $2p^{3} {}^{2}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3s {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	E _{II} , eV	E _B , eV	Transition	J
646 ,291 600 ,585 580 ,967 580 ,400	7 6 7 6	3,32 5,02 5,02 5,02 5,02	23,44 25,66 26,36 26,38	$\begin{array}{c} 2p^3 \ ^2D^{\circ} - 3s \ ^2P \\ 2p^3 \ ^2P^{\circ} - 3s' \ ^2D \\ 2p^3 \ ^2P^{\circ} - 2p^4 \ ^2P^{\circ} \\ 2p^3 \ ^2P^{\circ} - 2p^4 \ ^2P^{\circ} \end{array}$	$\begin{array}{c} 5/2 - 3/2 \\ 1/2, 3/2 - 3/2, 5/2 \\ 1/2, 3/2 - 3/2 \\ 1/2, 3/2 - 1/2 \end{array}$
555,121 555,056 539,853 539,547 539,086 538,318	5 7 8 8 7	3,33 3,32 0,00 0,00 0,00 3,33	25,66 25,66 22,96 22,98 23,00 26,36	$2p^{3} \ ^{2}D^{\circ} - 3s' \ ^{2}D$ $2p^{3} \ ^{2}D^{\circ} - 3s' \ ^{2}D$ $2p^{3} \ ^{4}S^{\circ} - 3s^{4}P$ $2p^{3} \ ^{4}S^{\circ} - 3s \ ^{4}P$ $2p^{3} \ ^{4}S^{\circ} - 3s \ ^{4}P$ $2p^{3} \ ^{2}D^{\circ} - 2p^{4} \ ^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
538 ,256 537 ,830 518 ,242 517 ,937 515 ,640	10 9 5 4 4	3 ,32 3 ,33 5 ,02 5 ,02 5 ,02	26,36 26,38 28,94 28,95 29,06	$2p^3 \ ^2D^{\circ} - 2p^4 \ ^2P$ $2p^3 \ ^2D^{\circ} - 2p^4 \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d \ ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
515,498 500,343 499,871 485,631 485,572	5 1 2 4 1	5,02 5,02 5,02 3,33 3,32	29,07 29,80 29,82 28,86 28,86	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{4}D$ $2p^{2} {}^{2}D^{\circ} - 3d {}^{4}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
485 ,515 485 ,465 485 ,086 484 ,025 483 ,976	5 0 6 2 5	3,33 3,32 3,32 3,33 3,32	28,86 28,86 28,88 28,94 28,94	$2p^{3} \ ^{2}D^{\circ}$ $-3d \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ}$ $-3d \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ}$ $-3d \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ}$ $-3d \ ^{2}P$ $2p^{3} \ ^{2}D^{\circ}$ $-3d \ ^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
483 ,752 481 ,755 481 ,704 481 ,635 481 ,587	4 3 1 0 4	3,33 3,33 3,32 3,33 3,32	28,95 29,06 29,06 29,07 29,07	$2p^{3} \ ^{2}D^{\circ} - 3d \ ^{2}P$ $2p^{3} \ ^{2}D^{\circ} - 3d \ ^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
470,408 468,766 467,926 465,760 465,529	4 2 0 2 1	5,02 5,02 3,32 5,02 5,02	31 ,37 31 ,46 29 ,82 31 ,64 31 ,65	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
464,785 464,310 464,194 458,422 456,997	3 1 2 0 1	5,02 5,02 5,02 5,02 5,02	31,69 31,72 31,73 32,06 32,15	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4s' {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
445,638 445,601 443,681 442,048 442,001	4 4 0 4 4	3,33 3,32 5,02 3,33 3,32	31,15 31,15 32,96 31,37 31,37	$2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $2p^{3} \ ^{2}P^{\circ} - 5d \ ^{2}D$ $2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}D$ $2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}D$	3/2 - 5/2 $5/2 - 7/2$ $3/2 - 5/2$ $3/2 - 3/2$ $5/2 - 5/2$
440 ,598 440 ,552 437 ,683 437 ,332 436 ,649	2 3 3 3 0	3,33 3,32 3,33 3,32 3,33	31,46 31,46 31,65 31,67 31,72	$2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}P$ $2p^{3} \ ^{2}D^{\circ} - 3d' \ ^{2}P$ $2p^{3} \ ^{2}D^{\circ} - 4d \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ} - 4d \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ} - 4d \ ^{2}D$	3/2 $1/25/2$ $3/23/2$ $5/25/2$ $7/23/2$ $3/2$
436,510 430,177 430,041 429,918 429,716	1 6 6 5 4	3,32 0,00 0,00 0,00 0,00	31,73 28,82 28,83 28,84 28,85	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
429 ,647 429 ,557 426 ,526	5 2 1	0,00 0,00 5,02	28,86 28,86 34,08	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{2}F$ $2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}D$	3/2 - 3/2, 5/2 $3/2 - 5/2$ $1/2, 3/2 - 1/2, 3/2$

λ, Ă	I	E _H , eV	$E_{\mathbf{B}}$, eV	Transition	J
425 ,273 424 ,577	0	5,02 5,02	34 ,17 34 ,22	$2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}P \ 2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}S$	$\frac{1}{2}$, $\frac{3}{2}$, $\frac{1}{2}$, $\frac{3}{2}$
418,812 418,598 403,372 403,273 403,087	0 i 0 0 0	3,32 0,00 3,33 3,32 3,33	32,93 29,62 34,06 34,07 34,08	$2p^{3} {}^{2}D^{\circ} - 5d {}^{2}F$ $2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}D$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2, & 5/2 \end{array}$
403,035 392,322 392,002 391,943 391,912	0 3 3 2 1	3,32 0,00 0,00 0,00 0,00	34,08 31,60 31,63 31,63 31,63	$2p^{3} {}^{2}D^{\circ}$ $-4d' {}^{2}D$ $2p^{3} {}^{4}S^{\circ}$ $-4d {}^{4}D$ $2p^{3} {}^{4}S^{\circ}$ $-4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ}$ $-4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ}$ $-4d {}^{4}P$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
377 ,045 376 ,745 376 ,693	0 0 0	00, 0 00, 0 00, 0	32,88 32,91 32,91	$2p^{3} {}^{4}S^{\circ} - 5d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$	3/2 - 3/2, 5/2 $3/2 - 5/2$ $3/2 - 3/2, 1/2$

O III, ground state $1s^2\,2s^2\,2p^2\,^3P_0$ Ionization potential 443193,5 cm $^{-1}$; 54,934 eV

	•		,	,	
λ, Å	I	$E_{ m H}, \ { m eV}$	$E_{\mathtt{B}},\;eV$	Transition	J
5592,37 5592,01 5508,11 5268,06 4569,50	$\begin{array}{c} \underline{6} \\ \underline{1} \\ \underline{2} \\ \underline{1} \end{array}$	33,86 38,01 38,01 38,90 52,86	36,07 40,23 40,26 41,26 55,56	$3s {}^{1}P^{\circ} - 3p {}^{1}P$ $3p {}^{1}D - 3d {}^{3}F^{\circ}$ $3p {}^{1}D - 3d {}^{1}D^{\circ}$ $3p {}^{1}S - 3d {}^{1}P^{\circ}$ $3p' {}^{1}D^{\circ} - 3d' {}^{1}F$	1-1 2-2 2-2 2-2 0-1 2-3
4555,30 4529,7 4474,95 4461,56 4447,82	0 00 1 1 0	46,91 46,62 52,86 46,62 46,62	49,63 49,36 55,60 49,36 49,41	3p ³ P°-3d ³ P 3p ⁵ S°-3d ⁵ D 3p' ¹ D°-3d' ¹ D 3p ⁵ S°-3d ⁵ P 3p ⁵ S°-3d ⁵ P	$ \begin{array}{r} 2-2 \\ 2-3 \\ 2-2 \\ 2-3 \\ 2-2 \end{array} $
4440 ,1 4434 ,43 4239 ,5 4081 ,10 4073 ,90	0 2 00 1 0	46 ,62 33 ,15 43 ,43 43 ,41	49 ,41 36 ,07 46 ,47 46 ,45	$3p {}^{5}S^{\circ} - 3d {}^{5}P$ $ 3s {}^{3}P^{\circ} - 3p {}^{1}P$ $3s {}^{3}P - 3p {}^{3}D^{\circ}$ $3s {}^{3}P - 3p {}^{3}D^{\circ}$	$ \begin{array}{c} 2-1 \\ -1 \\ 1-1 \\ 2-3 \\ 1-2 \end{array} $
3961,59 3935,0 3816,75 3810,99 3791,26	8 2 1 2 6	38,01 - 38,01 33,18 33,18	41 ,14 - 41 ,26 36 ,43 36 ,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-3 \\ - \\ 2-1 \\ 2-1 \\ 2-2 \end{array} $
3774,00 3759,87 3757,21 3754,67 3734,80	6 9 5 7 1	33 ,15 33 ,18 33 ,13 33 ,15 42 ,01	36 ,43 36 ,48 36 ,43 36 ,45 45 ,33	$3s ^3P^{\circ} - 3p ^3D$ $3s ^3P^{\circ} - 3p ^3D$ $3s ^3P^{\circ} - 3p ^3D$ $3s ^3P^{\circ} - 3p ^3D$ $3s ^5P - 3p ^5D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 0 - 1 \\ 1 - 2 \\ 3 - 2 \end{array} $
3732 ,13 3729 ,70 3728 ,82 3728 ,49 3725 ,30	1 1 1 0 3	37,25 46,44 46,47 46,45 37,25	40,57 49,76 49,79 49,77 40,57	$3p ^3P - 3d ^3D^{\circ}$ $3p ^3D^{\circ} - 3d ^3F$ $3p ^3D^{\circ} - 3d ^3F$ $3p ^3D^{\circ} - 3d ^3F$ $3p ^3P - 3d ^3D^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 3-4 \\ 2-3 \\ 2-2 \end{array} $
3721,95 3720,86 3715,08	1 3 6	41,99 42,01 37,25	45 ,32 45 ,34 40 ,58	3s ⁵ P-3p ⁵ D° 3s ⁵ P-3p ⁵ D° 3p ³ P-3d ³ D°	2—1 3—3 2—3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3714,03 3712,48	$\frac{2}{2}$	37,23 41,99	40,57 45,33	3p ³ P-3d ³ D° 3s ⁵ P-3p ⁵ D°	1—1 2—2
3709,52 3707,24 3704,73 3703,37 3702,75	2 6 3 5 5	41,97 37,23 41,97 42,01 37,22	45,31 40,57 45,32 45,36 40,57	$3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$ $3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$	1-0 1-2 1-1 3-4 0-1
3698,70 3695,37 3653,00 3650,70 3649,20	5 4 1 0 00	41,99 41,97 46,92 46,91 46,91	45,34 45,33 50,31 50,31 50,31	$3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3s {}^{5}P - 3p {}^{5}D^{\circ}$ $3p {}^{3}P^{\circ} - 3d {}^{3}D$ $3p {}^{3}P^{\circ} - 3d {}^{3}D$ $3p {}^{3}P^{\circ} - 3d {}^{3}D$	2-3 1-2 0-1 1-1 2-1
3646 ,84 3645 ,20 3638 ,70 3556 ,90 3475 ,26	2 1 3 1	46,91 46,91 46,91 43,43 45,36	50,31 50,31 50,32 46,91 48,92	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3s \ ^{3}P - 3p \ ^{3}P^{\circ}$ $3p \ ^{5}D^{\circ} - 3d \ ^{5}F$	1—2 2—2 2—3 2—2 4—3
3466 ,90 3466 ,15 3459 ,98 3459 ,52 3455 ,12	0 2 2 0 5	45,34 45,36 45,34 45,33 45,36	48,92 48,93 48,92 48,91 48,94	3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F	3-2 4-4 3-3 2-1 4-5
3454 ,90 3451 ,33 3450 ,94 3448 ,05 3447 ,22	$\frac{2}{1}$ 4 0 1	45 ,33 45 ,32 45 ,34 45 ,33 45 ,32	48 ,92 48 ,91 48 ,93 48 ,92 48 ,91	3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F	2-2 1-1 3-4 2-3 0-1
3446 ,73 3444 ,10 3440 ,39 3430 ,60 3428 ,67	2 5 4 4 3	45,32 37,25 36,98 37,25 37,23	48,92 40,85 40,58 40,86 40,86	$3p ^5D^{\circ} - 3d ^5F$ $3p ^3P - 3d ^3P^{\circ}$ $2p^4 ^1D - 3d ^3D^{\circ}$ $3p ^3P - 3d ^3P^{\circ}$ $3p ^3P - 3d ^3P^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-3 \\ 2-1 \\ 1-2 \end{array} $
3427,42 3415,29 3408,13 3405,74 3399,71	3 3 1 2 2	37 ,23 37 ,23 37 ,22 —	40,86 40,87 40,86	3p 3P—3d 3P° 3p 3P—3d 3P° 3p 3P—3d 3P° ————————————————————————————————————	
3394 ,26 3384 ,95 3383 ,85 3382 ,69 3376 ,82	1 4 2 3 1	45,67 45,71 45,70 45,70 45,69	49,36 49,37 49,36 49,36 49,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3 3-4 2-2 2-3 1-1
3376,66 3369,40 3363,83 3362,38 3355,92	2 00 1 4 3	36,89 36,89 42,01 45,71	40,57 40,57 45,70 49,40	3p 3S-3d 3D° 3p 3S-3d 3D° 3s 5P-3p 5P° 3p 5P°-3d 5P	- 1-1 1-2 3-2 3-3
3350,99 3350,68 3348,05 3344,26	$egin{array}{c} 4 \ 3 \ 2 \ 2 \ \end{array}$	42,01 41,99 45,71 45,70 41,99	45,71 45,69 49,41 49,40 45,70	$3s {}^{5}P - 3p {}^{5}P^{\circ}$ $3s {}^{5}P - 3p {}^{5}P^{\circ}$ $3p {}^{5}P^{\circ} - 3d {}^{5}P$ $3p {}^{5}P^{\circ} - 3d {}^{5}P$ $3s {}^{5}P - 3p {}^{5}P^{\circ}$	3-3 2-1 3-2 2-3 2-2
3340,74 3336,78 3333,00 3332,49	6 2	33,18 45,70 41,97 41,99 45,70	36,89 49,41 45,69 45,71 49,41	$3s \ ^3P^{\circ} - 3p \ ^3S$ $3p \ ^5P^{\circ} - 3d \ ^5P$ $3s \ ^5P - 3p \ ^5P^{\circ}$ $3s \ ^5P - 3p \ ^5P^{\circ}$ $3p \ ^5P^{\circ} - 3d \ ^5P$	2-1 2-2 1-1 2-3
3330,40	4 1	45,69 41,97	49 ,41 49 ,41 45 ,70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 1—2 1—2

λ, Å	I	$E_{ m H}^{},~{ m eV}$	$E_{ m B},~{ m eV}$	Transition	J
3326 ,16	0	45,69	49 ,41	3p ⁵ P°—3d ⁵ P	1—1
3312,30	5	33 ,15	36,89	3s ³ P°-3p ³ S	1-1
3305,77	0	36 ,48	40,23	3p ³ D-3d ³ F°	3-2
3299,36	3	33 ,13	36,89	3s ³ P°-3p ³ S	0-1
3284,57	4	36 ,48	40,25	3p ³ D-3d ³ F°	3-3
3281,94	3	36 ,45	40,23	3p ³ D-3d ³ F°	2-2
3279,97	1	46 ,25	50,03	$4p ^{1}S - 5d ^{1}P^{\circ}$	0—1
3267,31	5	36 ,43	40,23	$3p ^{3}D - 3d ^{3}F^{\circ}$	1—2
3265,46	10	36 ,48	40,27	$3p ^{3}D - 3d ^{3}F^{\circ}$	3—4
3260,98	8	36 ,45	40,25	$3p ^{3}D - 3d ^{3}F^{\circ}$	2—3
3252,94	2	36 ,45	40,26	$3p ^{3}D - 3d ^{1}D^{\circ}$	2—2
3238,57	5	36 ,43	40,26	3p 3D-3d 1D°	1—2
3215,97	1	46 ,47	50,32	3p 3D°-3d 3D	3—3
3207,12	1	46 ,45	50,31	3p 3D°-3d 3D	2—2
3200,95	1	46 ,44	50,31	3p 3D°-3d 3D	1—1
3132,86	6	36 ,89	40,85	3p 3S-3d 3P°	1—2
3121,71	5	36,89	40,86	3p 3S-3d 3P°	1—1
3115,73	4	36,89	40,87	3p 3S-3d 3P°	1—0
3095,81	00	45,36	49,36	3p 5D°-3d 5D	4—3
3088,04	2	45,36	49,37	3p 5D°-3d 5D	4—4
3084,63	0	45,34	49,36	3p 5D°-3d 5D	3—2
3083,65	1	45,34	49,36	3p ⁵ D°-3d ⁵ D	3—3
3075,95	0	45,34	49,37	3p ⁵ D°-3d ⁵ D	3—4
3075,19	0	45,33	49,36	3p ⁵ D°-3d ⁵ D	2—2
3074,68	00	45,33	49,36	3p ⁵ D°-3d ⁵ D	2—1
3074,15	00	45,33	49,36	3p ⁵ D°-3d ⁵ D	2—3
3068,68	0	45,32	49,36	$3p ^5D^{\circ} - 3d ^5D$	1-2
3068,06	00	45,32	49,36	$3p ^5D^{\circ} - 3d ^5D$	1-0
3065,01	00	45,32	49,36	$3p ^5D^{\circ} - 3d ^5D$	0-1
3059,30	6	33,18	37,23	$3s ^3P^{\circ} - 3p ^3P$	2-1
3047,13	8	33,18	37,25	$3s ^3P^{\circ} - 3p ^3P$	2-2
3043,02	5	33,15	37,22	$3s ^3P^{\circ} - 3p ^3P$	1—0
3035,43	4	33,15	37,23	$3s ^3P^{\circ} - 3p ^3P$	1—1
3034,32	0	41,26	45,34	$3d ^1P^{\circ} - 4p ^1P$	1—1
3024,57	4	33,13	37,23	$3s ^3P^{\circ} - 3p ^3P$	0—1
3024,36	1	36,48	40,57	$3p ^3D - 3d ^3D^{\circ}$	3—2
3023,45	5	33,15	37,25	$3s ^3P^{\circ} - 3p ^3P$	1—2
3017,63	5	36,48	40,58	$3p ^3D - 3d ^3D^{\circ}$	3—3
3008,79	3	36,45	40,57	$3p ^3D - 3d ^3P^{\circ}$	2—1
3004,35	4	36,45	40,57	$3p ^3D - 3d ^3D^{\circ}$	2—2
2997,71	2	36,45	40,58	$3p ^3D - 3d ^3D^{\circ}$	2—3
2996,51	3	36,43	40,57	$3p ^3D - 3d ^3D^{\circ}$	1-1
2992,11	2	36,43	40,57	$3p ^3D - 3d ^3D^{\circ}$	1-2
2983,78	9	33,86	38,01	$3s ^1P^{\circ} - 3p ^1D$	1-2
2983,66	1	36,07	40,23	$3p ^1P - 3d ^3F^{\circ}$	1-2
2959,74	5	36,07	40,26	$3p ^1P - 3d ^1D^{\circ}$	1-2
2926,33 2916,40 2912,98 2903,30 2898,48	2 4 2 4 1			$2p^{4} ^{1}D - 3d ^{1}P^{\circ}$	
2895,45 2893,70 2885,36 2881,70 2881,28	2 3 3 4 2		_ _ _ _	 	_ _ _ _ _
2879 ,80 2873 ,82	$\frac{0}{2}$	45 ,47 —	49 ,7 8 —	4p ³ D—5d ³ F° —	3 <u></u> 2 157

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λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
2866 ,73 2863 ,57 2862 ,52	2 3 3		_ _ _	_ _ _	_ _ _
2862,26 2861,38 2857,89 2856,78 2853,78	3 3 3 1	45 ,45 — — — — 45 ,44	49,78 — — 49,78	4p ³ D—5d ³ F° ————————————————————————————————————	2—2 — — — 1—2
2848,91 2845,84 2844,39 2836,34 2818,68	6 3 2 4 1		 40 ,85 40 ,85	3p 3D-3d 3P° 3p 3D-3d 3P°	
2809,63 2799,01 2797,97 2794,09 2789,89	3 2 1 5 3	36,45 36,43 45,47 36,43	40,86 40,86 49,90 40,87	3p 3D—3d 3P° 3p 3D—3d 3P° 4p 3D—5d 3D° 3p 3D—3d 3P° —	2—1 1—1 3—3 1—0
2784 ,48 2772 ,04 2770 ,15 2766 ,50 2761 ,30	2 2 2 2 3	45 ,34 — — —	49,81 — — —	4p ¹ P = 5d ¹ D° = - = -	1—2 — — —
2756 ,22 2752 ,47 2745 ,00 2739 ,15 2735 ,14	$egin{array}{c} 1 \\ 0 \\ 2 \\ 0 \\ 1 \end{array}$	36 ,07 36 ,07 49 ,65 49 ,65	40,57 40,57 — 54,18 54,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 1—2 — 0—1 1—1
2726 ,95 2713 ,40 2708 ,87 2701 ,05 2696 ,11	1 2 1 3 2	49,63 40,87 40,86 40,86	54, 18 45, 44 45, 44 45, 45	3d ³ P-4p ³ S° 3p ³ P°-4p ³ D 3d ³ P°-4p ³ D 3d ³ P°-4p ³ D	2—1 0—1 1—1 1—2 —
2696,00 2695,49 2692,74 2687,53 2686,14	3 6 1 5 10	45,04 40,85 45,04 42,01	49,63 45,45 49,65 46,62	3p 3S°-3d 3P 3d 3P°-4p 3D 3p 3S°-3d 3P 3s 5P-3p 5S°	$ \begin{array}{c} -\\ 1-2\\ 2-2\\ 1-1\\ 3-2 \end{array} $
2683 ,65 2681 ,42 2677 ,81 2674 ,57 2670 ,10	4 2 3 8 2	45,04 40,85 41,99	49 ,65 45 ,47 46 ,62	3p ³ S°-3d ³ P - 3p ³ P°-4p ³ D 3s ⁵ P-3p ⁵ S° -	1—0 — 2—3 2—2 —
2665,69 2641,53 2640,98 2640,68 2639,04	7 3 2 2 2 2	41,97 	46 ,62 — — — — —	3s ⁵ P-3p ⁵ S°	1—2 — — — —
2628 ,53 2623 ,69 2622 ,41 2622 ,32 2609 ,59	2 3 3 2 4		- 45,98 45,62	 3d ¹ P°-4p ¹ D 3d ³ P°-4p ³ S	
2605,41 2597,69 2596,79 2588,23 2582,99	6 8 00 0 3	40,86 40,85 40,57 36,07	45,62 45,62 45,34 40,85	$3d\ ^{3}P^{\circ}-4p\ ^{3}S$ $3d\ ^{3}P^{\circ}-4p\ ^{3}S$ $3d\ ^{3}D^{\circ}-4p\ ^{1}P$ $3p\ ^{1}P-3d\ ^{3}P^{\circ}$	1-1 2-1 1-1 1-1

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2578 ,27 2572 ,30 2569 ,21 2569 ,11 2558 ,06	00 2 2 1 8	36,45 — 36,43 41,14	41,26 — — 41,26 45,98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 — — — 1—1 3—2
2549 ,62 2547 ,45 2546 ,43 2542 ,68 2539 ,50	2 2 4 5 2	40,57 40,58 40,57 40,57 40,57	45,44 45,45 45,44 45,45 45,45	$3p \ ^{3}D^{\circ}-4p \ ^{3}D$ $3p \ ^{3}D^{\circ}-4p \ ^{3}D$ $3d \ ^{3}D^{\circ}-4p \ ^{3}D$ $3d \ ^{3}D^{\circ}-4p \ ^{3}D$ $3d \ ^{3}D^{\circ}-4p \ ^{3}D$ $3d \ ^{3}D^{\circ}-4p \ ^{3}D$	2—1 3—2 1—1 2—2 1—2
2534,08	6	40,58	45 ,47	$3d \ ^{3}D^{\circ}-4p \ ^{3}D$	3—3
2529,36	1	40,57	45 ,47	$3p \ ^{3}D^{\circ}-4p \ ^{3}D$	2—3
2492,2	00	49,36	54 ,34	$3d \ ^{5}D-4p \ ^{5}D^{\circ}$	2—1
2489,0	00	49,36	54 ,34	$3d \ ^{5}D-4p \ ^{5}D^{\circ}$	3—2
2488,3	00	49,37	54 ,35	$3d \ ^{5}D-4p \ ^{5}D^{\circ}$	4—3
2485 ,27	00	49,36	54,34	$3d \ ^{5}D-4p \ ^{5}D^{\circ}$	2—2
2483 ,24	0	49,36	54,35		3—3
2482 ,60	0	49,36	54,35		2—3
2480 ,73	1	49,37	54,37		4—4
2475 ,73	00	49,36	54,37		3—4
2457,8 2454,99 2454,21 2450,06 2449,38	00 8 0 2 2	40,57 33,86 49,41 —	45,62 38,90 54,46 — —	$ 3d \ ^{3}D^{\circ}-4p \ ^{3}S 3s \ ^{1}P^{\circ}-3p \ ^{1}S 3d \ ^{5}P-4p \ ^{5}P^{\circ} - $	2—1 1—0 2—1 —
2446,92	00	49,40	54,47	$3d {}^{5}P - 4p {}^{5}P^{\circ}$ $3d {}^{5}P - 4p {}^{5}P^{\circ}$ $3d {}^{1}D^{\circ} - 4p {}^{1}P$ $3d {}^{3}P^{\circ} - 4p {}^{3}P$ $3d {}^{3}F - 4p {}^{3}D^{\circ}$	3—2
2441,06	2	49,40	54,48		3—3
2438,83	5	40,26	45,34		2—1
2434,96	2	40,85	45,94		2—2
2431,69	0	49,79	54,89		4—3
2429,65	0	49,36	54,46	3d ⁵ D-4p ⁵ P°	1—1
2429,35	1	49,36	54,46	3d ⁵ D-4p ⁵ P°	2—1
2426,94	2	49,36	54,47	3d ⁵ D-4p ⁵ P°	3—2
2426,35	0	49,36	54,46	3d ⁵ D-4p ⁵ P°	2—1, 2
2425,93	2	49,37	54,48	3d ⁵ D-4p ⁵ P°	4—3
2422,84	5	40,23	45,34	$\begin{array}{c} 3d\ ^{3}F^{\circ}-4p\ ^{1}P\\ 3d\ ^{5}D-4p\ ^{5}P^{\circ}\\ 3d\ ^{1}D^{\circ}-4p\ ^{3}D\\ 3p\ ^{1}P-3d\ ^{1}P^{\circ}\\ 3d\ ^{1}D^{\circ}-4p\ ^{3}D\\ \end{array}$	2—1
2421,2	00	49,36	54,48		3—3
2394,33	4	40,26	45,44		2—1
2390,44	8	36,07	41,26		1—1
2388,20	1	40,26	45,45		2—2
2383,92	6	40,25	45 ,45	3d ³ F°—4p ³ D	3-2 $ 4-3 $ $ 2-1 $ $ 2-2 $ $ 3-3$
2382,32	7	40,27	45 ,47	3d ³ F°—4p ³ D	
2378,90	4	40,23	45 ,44	3d ³ F°—4p ³ D	
2372,82	2	40,23	45 ,45	3d ³ F°—4p ³ D	
2372,21	3	40,25	45 ,47	3d ³ F°—4p ³ D	
2319,52 2317,37 2315,52 2314,76 2311,58	2 3 4 2 2	40,57 40,57 40,58 40,57 40,57	45,91 45,92 45,94 45,92 45,94	$3p \ ^{3}D^{\circ}-4p \ ^{3}P$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 3 - 2 \\ 1 - 1 \\ 2 - 2 \end{array} $
2308,70	1	35,21	40,57	$2p^{4} ^{3}P - ^{3}d ^{3}D^{\circ}$ $3d ^{5}F - ^{4}p ^{5}D^{\circ}$ $- $ $3d ^{5}F - ^{4}p ^{5}D^{\circ}$ $3d ^{5}F - ^{4}p ^{5}D^{\circ}$	1—2
2288,36	00	48,92	54,33		2—1
2288,20	2	—	—		—
2288,12	00	48,92	54,34		3—2
2287,21	1	48,93	54,35		4—3
2286 ,40 2285 ,66 2285 ,07	$\begin{array}{c} 0 \\ 2 \\ 00 \end{array}$	48 ,91 48 ,94 48 ,92	54,33 54,37 54,34	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 5—4 2—2

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λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
2239 ,10 2228 ,15	$\frac{2}{3}$	38,90	_ 44 ,47	3p ¹ S-4s ¹ P°	 0—1
2186,97 2181,66 2165,32 2162,88 2107,13	1 1 3 5 5	35,18 35,18 40,26 — —	40 ,85 40 ,86 45 ,98 — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 2—1 2—2 —
2106,07 2089,27 2052,53 2045,41 1916,48	5 2 4 5 2	_ _ _ _	 _ _ _	 	_ _ _ _
1907,06 1902,89 1153,773 1150,882 1149,603	1 1 3 2 1		 35,18 35,21 35,22	$\begin{array}{c} - \\ - \\ 2p^3 \ {}^3S^{\circ} - 2p^4 \ {}^3P \\ 2p^3 \ {}^3S^{\circ} - 2p^4 \ {}^3P \\ 2p^3 \ {}^3S^{\circ} - 2p^4 \ {}^3P \end{array}$	 1—2 1—1 1—0
1138,545 898,957 887,404 878,728 875,534	2 8 10 11 9	26,09 23,19 — — —	36,98 36,98 — — —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 2—2 — — —
871,099 835,292 835,096 833,742 832,927	10 16 14 16 14	0,04 0,04 0,01 0,00	 14 ,88 14 ,88 14 ,88 14 ,88	$\begin{array}{c} - \\ 2p^2 \ ^3P - 2p^3 \ ^3D^{\circ} \\ 2p^2 \ ^3P - 2p^3 \ ^3D^{\circ} \\ 2p^2 \ ^3P - 2p^3 \ ^3D^{\circ} \\ 2p \ ^3P - 2p^3 \ ^3D^{\circ} \end{array}$	2—3 2—1, 2 1—1, 2 0—1
752,762 707,315 706,298 706,224 705,762	4 4 2 3 2	26,09 17,65 17,65 17,65 17,65	42,56 35,18 35,21 35,21 35,22	$2p^{3} {}^{1}P^{\circ} - 2p^{4} {}^{1}S$ $2p^{3} {}^{3}P^{\circ} - 2p^{4} {}^{3}P$	$ \begin{array}{c} 1-0 \\ 1, 2-2 \\ 0-1 \\ 1, 2-1 \\ 1-0 \end{array} $
703,850 702,899 702,822 702,332 659,538	18 17 16 16 0	0,04 0,01 0,01 0,00 17,65	17,65 17,65 17,65 17,65 36,45	$2p^{2} {}^{3}P - 2p^{3} {}^{3}P^{\circ}$ $2p^{3} {}^{3}P^{\circ} - 3p {}^{3}D$	2-1, 2 1-1, 2 1-0 0-1 1-2
658,758 644,159 610,850 610,746 610,043	1 6 6 8 7	17,65 17,65 14,88 14,88 14,88	36,48 36,89 35,18 35,18 35,21	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-3 \\ 1, 2-1 \\ 2-2 \\ 3-2 \\ 2, 1-1 \end{array} $
609 ,705 599 ,598 597 ,818 574 ,065 554 ,275	6 18 15 00 0	14,88 2,51 5,35 14,88 14,88	35,22 23,19 26,09 36,48 37,25	$\begin{array}{c} 2p^{3} {}^{3}D^{\circ} - 2p^{4} {}^{3}P \\ 2p^{2} {}^{1}D - 2p^{3} {}^{1}D^{\circ} \\ 2p^{2} {}^{1}S - 2p^{3} {}^{1}P^{\circ} \\ 2p^{3} {}^{3}D^{\circ} - 3p {}^{3}D \\ 2p^{3} {}^{3}D^{\circ} - 3p {}^{3}P \end{array}$	1-0 2-2 0-1 3-3 3-2
525,795 508,182 507,683 507,391 491,980	18 18 17 16 1	2,51 0,01 0,01 0,00 24,43	26,09 24,43 24,43 24,43 49,63	$2p^{2} ^{1}D - 2p^{3} ^{1}P^{\circ}$ $2p^{2} ^{3}P - 2p^{3} ^{3}S^{\circ}$ $2p^{2} ^{3}P - 2p^{3} ^{3}S^{\circ}$ $2p^{2} ^{3}P - 2p^{3} ^{3}S^{\circ}$ $2p^{3} ^{3}S^{\circ} - 3d ^{3}P$	$ \begin{array}{c} 2-1 \\ 2-1 \\ 1-1 \\ 0-1 \\ 1-2 \end{array} $
491 ,714 481 ,587 481 ,381 481 ,354 480 ,955	$0 \\ 4 \\ 2 \\ 3 \\ 4$	24,43 17,65 17,65 17,65 17,65	49,65 43,39 43,41 43,21 43,43	$\begin{array}{c} 2p^{3} {}^{3}S^{\circ} - 3d {}^{3}P \\ 2p^{3} {}^{3}P^{\circ} - 3s {}^{3}P \end{array}$	$ \begin{array}{c} 1-1 \\ 1-0 \\ 0-1 \\ 1, 2-1 \\ 1, 2-2 \end{array} $

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E_{B} , eV	Transition	J
459 ,896 434 ,975 434 ,840 434 ,646 434 ,256	1 10 2 3 4	5,35 14,88 14,88 14,88	33,86 43,39 43,41 43,43	$\begin{array}{c} - \\ 2p^2 {}^{1}S - 3s {}^{1}P^{\circ} \\ 2p^3 {}^{3}D^{\circ} - 3s {}^{3}P \\ 2p^3 {}^{3}D^{\circ} - 3s {}^{3}P \\ 2p^3 {}^{3}D^{\circ} - 3s {}^{3}P \end{array}$	- 0-1 1-0 2-1 3-2
397,310	0	17,65	48,86	$2p^3 ^3P^{\circ} - ^3s' ^3D$	0-1 $1-2$ $2-3$ $2-1$ $1,2-2$
397,231	1	17,65	48,86	$2p^3 ^3P^{\circ} - ^3s' ^3D$	
397,120	2	17,65	48,87	$2p^3 ^3P^{\circ} - ^3s' ^3D$	
395,558	2	2,51	33,86	$2p^2 ^1D - ^3s ^1P^{\circ}$	
387,639	4	17,65	49,63	$2p^3 ^3P^{\circ} - ^3d ^3P$	
387,482	3	17,65	49,65	$2p^3 ^3P^{\circ} - 3d ^3P$	$0, 1, 2-1 \\ 1-0 \\ 2-3 \\ 2-2 \\ 0, 1-1$
387,398	2	17,65	49,65	$2p^3 ^3P^{\circ} - 3d ^3P$	
382,903	1	23,19	55,55	$2p^3 ^1D^{\circ} - 3d' ^1F^{\circ}$	
382,214	1	23,19	55,55	$2p^3 ^1D^{\circ} - 3d' ^1D^{\circ}$	
379,631	2	17,65	50,31	$2p^3 ^3P^{\circ} - 3d ^3D$	
379,575	3	17,65	50,31	$2p^3 ^3P^{\circ} - 3d ^3D$	1, 2-2
379,505	4	17,65	50,32	$2p^3 ^3P^{\circ} - 3d ^3D$	2-3
374,436	8	0,04	33,15	$2p^2 ^3P - 3s ^3P^{\circ}$	2-1
374,331	8	0,01	33,13	$2p^2 ^3P - 3s ^3P^{\circ}$	1-0
374,165	8	0,01	33,15	$2p^2 ^3P - 3s ^3P^{\circ}$	1-1
374 ,075 374 ,005 373 ,805 364 ,940 364 ,867	10 8 8 1 2	0,04 0,00 0,01 14,88 14,88	33,18 33,15 33,18 48,86 48,86	$2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{3} {}^{3}D^{\circ} - 3s' {}^{3}D$ $2p^{3} {}^{3}D^{\circ} - 3s' {}^{3}D$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-2 \\ 1-1 \\ 2-2 \end{array} $
364,739 359,616 359,415 359,384 359,223	3 1 2 7 8	14,88 	48 ,87 — 41 ,97 41 ,97 41 ,99	$2p^3 \ ^3D^{\circ} - 3s' \ ^3D$ $ 2p^3 \ ^5S^{\circ} - 3s \ ^5P$ $2p^3 \ ^5S^{\circ} - 3s \ ^5P$ $2p^3 \ ^5S^{\circ} - 3s \ ^5P$	$ \begin{array}{c} 3-3 \\ -1 \\ 2-1 \\ 2-1 \\ 2-2 \end{array} $
359,016	8	7 ,48	42,01	$2p^3$ ${}^5S^{\circ}$ — $3s$ 5P	2—3
356,768	0	14 ,88	49,63	$2p^3$ ${}^3D^{\circ}$ — $3d$ 3P	2—2
356,725	2	14 ,88	49,63	$2p^3$ ${}^3D^{\circ}$ — $3d$ 3P	3—2
356,625	1	14 ,88	49,65	$2p^3$ ${}^3D^{\circ}$ — $3d$ 3P	2—1
356,558	0	14 ,88	49,65	$2p^3$ ${}^3D^{\circ}$ — $3d$ 3P	1—0
355, 469 355, 333 355, 293 355, 137 350, 703	5 5 3 6 8	14,88 14,88 14,88 14,88	49,76 49,77 49,77 49,79	$2p^3 ^3D^{\circ} - 3d ^3F$ $-$	1—2 2—3 3—3 3—4 —
349,961	1	14,88	50,31	$2p^3 ^3D^{\circ} - 3d ^3D$	1—1
349,918	2	14,88	50,31	$2p^3 ^3D^{\circ} - 3d ^3D$	2—2
349,825	3	14,88	50,32	$2p^3 ^3D^{\circ} - 3d ^3D$	3—3
345,309	10	5,35	41,26	$2p^2 ^1S - 3d ^1P^{\circ}$	0—1
328,742	9	2,51	40,23	$2p^2 ^1D - 3d ^3F^{\circ}$	2—2
328 ,448	10	2,51	40,26	$\begin{array}{c} 2p^{2} ^{1}D - 3d ^{1}D^{\circ} \\ 2p^{2} ^{1}D - 3d ^{1}F^{\circ} \\ 2p^{3} ^{3}P^{\circ} - 3d' ^{3}P \\ 2p^{2} ^{1}D - 3d ^{1}P^{\circ} \\ 2p^{3} ^{3}P^{\circ} - 3d' ^{3}P \end{array}$	2—2
320 ,979	12	2,51	41,14		2—3
320 ,720	2	17,65	56,74		—
319 ,996	3	2,51	41,26		2—1
317 ,265	1	17,65	56,74		—
316,967	3	5,35	44,47	$\begin{array}{c} 2p^2 {}^{1}S - 4s {}^{1}P^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}F^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{1}D^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}D^{\circ} \\ 2p^2 {}^{3}P - 3d {}^{3}D^{\circ} \end{array}$	0-1
308,306	2	0,04	40,25		2-3
308,051	1	0,01	40,26		1-2
305,879	4	0,04	40,57		2-1
305,836	8	0,04	40,57		2-2
305,769	10	0,04	40 ,58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3
305,703	8	0,01	40 ,57		1-1
305,656	9	0,01	40 ,58		1-2

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λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
305,596 303,799	8 9	0,00 0,04	40 ,57 40 ,85	$2p^2 {}^3P - 3d {}^3D^{\circ} \ 2p^2 {}^3P - 3d {}^3P^{\circ}$	0—1 2—2
303,693	7	0,04	40,86	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	$\begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 1-0 \\ 0-1 \end{array}$
303,621	7	0,01	40,85	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
303,515	7	0,01	40,86	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
303,460	7	0,01	40,87	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
303,411	7	0,00	40,86	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
300 ,455	3	14,88	56,14	$2p^3 \ ^3D^{\circ} - 3d' \ ^3F$	1, 2, 3-2, 3, 4
299 ,275	2	14,88	56,31	$2p^3 \ ^3D^{\circ} - 3d' \ ^3D$	1, 2, 3-1, 2, 3
296 ,270	1	14,88	56,74	$2p^3 \ ^3D^{\circ} - 3d' \ ^3P$	1, 2, 3-0, 2, 1
296 ,012	4	7,48	49,36	$2p^3 \ ^5S^{\circ} - 3d \ ^5D$	2-3
295 ,944	3	5,35	47,25	$2p^2 \ ^1S - 4d \ ^1P^{\circ}$	0-1
295,716 295,657 295,619 295,511 286,038	6 6 5 3 0	7,48 7,48 7,48 2,51 5,35	49,40 49,41 49,41 44,47 48,69	$2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^2 {}^1D - 4s {}^1P^{\circ}$ $2p^2 {}^1S - 5s {}^1P^{\circ}$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 2-1 \\ 2-1 \\ 0-1 \end{array} $
280 ,483 280 ,412 280 ,328 280 ,265 280 ,234	1 1 1 3	0,04 0,01 0,01 0,04 0,00	44 ,24 44 ,23 44 ,24 44 ,27 44 ,24	$2p^2 \ ^3P - 4s \ ^3P^\circ \ 2p^2 \ ^3P - 4s \ ^3P^\circ \ $	$ \begin{array}{r} 2-1 \\ 1-0 \\ 1-1 \\ 2-2 \\ 0-1 \end{array} $
280 ,116 280 ,030 279 ,787 277 ,514 277 ,385	1 2 3 1 7	0,01 2,51 2,51 5,35 2,51	44,27 46,79 46,82 50,03 47,21	$2p^2 {}^3P - 4s {}^3P^\circ \ 2p^2 {}^1D - 4d {}^3F^\circ \ 2p^2 {}^1D - 4d {}^1D^\circ \ 2p^2 {}^1S - 5d {}^1P^\circ \ 2p^2 {}^1D - 4d {}^1F^\circ \ $	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-2 \\ 0-1 \\ 2-3 \end{array} $
275,513	4	0,04	45,04	$2p^{2} {}^{3}P - 3p {}^{3}S^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 0-1 \\ 2-1 \\ 2-2 \end{array} $
275,366	3	0,01	45,04	$2p^{2} {}^{3}P - 3p {}^{3}S^{\circ}$	
275,281	2	0,00	45,04	$2p^{2} {}^{3}P - 3p {}^{3}S^{\circ}$	
271,611	0	7,48	53,12	$2p^{3} {}^{5}S^{\circ} - 4s {}^{5}P$	
271,523	1	7,48	53,14	$2p^{3} {}^{5}S^{\circ} - 4s {}^{5}P$	
271,403	1	7,48	53 ,16	$2p^3 ^5S^{\circ} - 4s ^5P$	$ \begin{array}{c} 2 - 3 \\ 2 - 1 \\ 2 - 2 \\ 1 - 1 \\ 2 - 3 \end{array} $
268,451	1	2,51	48 ,69	$2p^2 ^1D - 5s ^1P^{\circ}$	
267,121	4	0,04	46 ,45	$2p^2 ^3P - 3p ^3D^{\circ}$	
267,050	3	0,01	46 ,44	$2p^2 ^3P - 3p ^3D^{\circ}$	
267,030	7	0,04	46 ,47	$2p^2 ^3P - 3p ^3D^{\circ}$	
266,985	7	0,01	46,45	$2p^2$ 3P $- 3p$ $^3D^\circ$	$ \begin{array}{c} 1-2 \\ 0-1 \\ 2-2, 1 \\ 1-2, 1, 0 \\ 0-1 \end{array} $
266,967	6	0,00	46,44	$2p^2$ 3P $- 3p$ $^3D^\circ$	
264,480	6	0,04	46,91	$2p^2$ 3P $- 3p$ $^3P^\circ$	
264,338	5	0,01	46,91	$2p^2$ 3P $- 3p$ $^3P^\circ$	
264,257	4	0,00	46,91	$2p^2$ 3P $- 3p$ $^3P^\circ$	
263,903	0	0,04	47,02	$2p^2$ 3P — $4d$ 3D °	$ \begin{array}{r} 2-1 \\ 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $
263,861	3	0,04	47,02	$2p^2$ 3P — $4d$ 3D °	
263,818	5	0,04	47,03	$2p^2$ 3P — $4d$ 3D °	
263,768	3	0,01	47,02	$2p^2$ 3P — $4d$ 3D °	
263,728	4	0,01	47,02	$2p^2$ 3P — $4d$ 3D °	
263,692	3	0,00	47,02	$2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$	0-1 $2-2$ $2-2$ $2-2$ $2-2$
262,882	1	0,04	47,20	$2p^{2} {}^{3}P - 4d {}^{3}P^{\circ}$	
262,729	0	0,01	47,20	$2p^{2} {}^{3}P - 4d {}^{3}P^{\circ}$	
262,289	0	2,51	49,78	$2p^{2} {}^{1}D - 5d {}^{3}F^{\circ}$	
262,113	2	2,51	49,81	$2p^{2} {}^{1}D - 5d {}^{1}D^{\circ}$	
261,027	4	2,51	50,01	$2p^{2} ^{1}D - 5d ^{1}F^{\circ}$ $2p^{3} ^{5}S^{\circ} - 4d ^{5}P$ $2p^{2} ^{3}P - 5s ^{3}P^{\circ}$	2-3
256,506	3	7,48	55,81		2-3
256,460	3	7,48	55,82		2-2
256,425	2	7,48	55,83		2-1
255,302	0	0,04	48,62		2-1
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λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
255,158 255,044 253,548 248,618 248,574	1 0 0 2 1	0,04 0,01 2,51 0,04 0,01	48,62 48,62 51,41 49,90 49,90	$\begin{array}{c} 2p^2 \ ^3P - 5s \ ^3P^{\circ} \\ 2p^2 \ ^3P - 5s \ ^3P^{\circ} \\ 2p^2 \ ^3P - 6d \ ^1D^{\circ} \\ 2p^2 \ ^3P - 5d \ ^3D^{\circ} \\ 2p^2 \ ^3P - 5d \ ^3D^{\circ} \end{array}$	$\begin{array}{c} 2-2 \\ 1-2 \\ 2-2 \\ 2-3 \\ 1-2 \end{array}$
248 ,538 248 ,320 247 ,080 246 ,265 244 ,049	1 1 1 3 2	0,00 2,51 2,51 2,51 2,51	49,90 52,44 52,69 52,86 53,31	$2p^2$ 3P $-5d$ 3D ° $2p^2$ 1D $-7d$ 1F ° $2p^2$ 1D $-3p'$ 1F ° $2p^2$ 1D $-3p'$ 1D ° $2p^2$ 1D $-3p'$ 1P °	0-1 2-3 2-3 2-2 2-1
241,875 241,819 241,037 240,979 236,710	1 1 2 2 1	7,48 7,48 0,04 0,04	58 ,73 58 ,73 51 ,47 51 ,47	$2p^3 {}^5S^{\circ} - 5d {}^5P$ $2p^3 {}^5S^{\circ} - 5d {}^5P$ $2p^2 {}^3P - 6d {}^3D^{\circ}$ $2p^2 {}^3P - 6d {}^3D^{\circ}$ $-$	2-3 2-2, 1 2-3 2-3
228 ,988 228 ,893 226 ,038	0 0 1	0,04 0,01 0,04	54 ,18 54 ,18 54 ,89	$2p^2 {}^3P - 4p {}^3S^{\circ} \ 2p^2 {}^3P - 4p {}^3S^{\circ} \ 2p^2 {}^3P - 4p' {}^3D^{\circ}$	2—1 1—1 2—3

O IV, ground state $1s^2 \, 2s^2 \, 2p^{\, 2} P^{_{1/2}}_{1/2}$ Ionization potential 624396,5 cm $^{-1}$; 77,394 eV

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λ, Å	I	$E_{ m H}$, eV	E_{B} , eV	Transition	J
7004, 06 6931, 39 5452, 5 5426, 5 5362,42	- 	56,17 56,14 71,33 71,31 59,87	57,94 57,93 73,61 73,60 62,18	$3s ^{2}P^{\circ} - 3p ^{2}P$ $3s ^{2}P^{\circ} - 3p ^{2}P$ $4p ^{2}P - 4d ^{2}D^{\circ}$ $4p ^{2}P - 4d ^{2}D^{\circ}$ $3p ^{2}D - 3d ^{2}D^{\circ}$	3/2 - 3/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $5/2 - 5/2$
5305 ,32 4823 ,93 4813 ,07 4800 ,77 4799 ,2	15 1 10	59,84 59,36 59,36 59,35	62,18 61,93 61,94 61,93	$3p ^{2}D - 3d ^{2}D^{\circ}$ $3p ^{4}P - 3d ^{4}D^{\circ}$ $3p ^{4}P - 3d ^{4}D^{\circ}$ $3p ^{4}P - 3d ^{4}D^{\circ}$ $-$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ - \end{array} $
4798 ,25 4794 ,22 4787 ,7 4786 ,4 4783 ,43	5 2 3 20 4	59,36 59,35 — — 59,35	61,94 61,93 — 61,94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4779,09 4772,57 4568,5 4472,4 4262,3	2 2 	59,33 59,33 68,50 71,33 67,86	61,93 61,93 71,21 74,10 70,76	$3p ^4P - 3d ^4D^{\circ}$ $3p ^4P - 3d ^4D^{\circ}$ $5f ^2F^{\circ} - 6d ^2D$ $4p ^2P - 4d ^2P^{\circ}$ $3p' ^2D - 3d' ^2F^{\circ}$	$\begin{array}{c} {}^{1/2}_{-} {}^{1/2}_{2} \\ {}^{1/2}_{-} {}^{-} {}^{3/2}_{2} \\ {}^{5/2}_{2}, {}^{7/2}_{-} {}^{-} {}^{3/2}_{2}, {}^{5/2} \\ {}^{3/2}_{-} {}^{-} {}^{3/2}_{2} \\ {}^{5/2}_{-} {}^{-} {}^{7/2} \end{array}$
3995,47 3977,40 3974,66 3956,82 3945,29	2 1 -	59 ,36 59 ,36 59 ,35 59 ,35 59 ,35	62,46 62,48 62,46 62,48 62,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3942,14 3930,63 3774,38 3758,45 3755,82	 	59,33 59,33 58,08 58,08 58,06	62,48 62,49 61,37 61,38 61,36	3p 4P—3d 4P° 3p 4P—3d 4P° 3p 4D—3d 4F° 3p 4D—3d 4F° 3p 4D—3d 4F°	$ \begin{array}{c} 1/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 7/_2 - 5/_2 \\ 7/_2 - 7/_2 \\ 5/_2 - 3/_2 \end{array} $
					163

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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
3744 ,73 3736 ,78	0	58,06 { 58,08 58,04	61,37 61,40 61,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \end{array} $
3734 3729 ,03 3725 ,81	3 3 2	58,06 58,04 58,03	61 ,38 61 ,37 61 ,36	$\begin{array}{c}$	$\begin{array}{c} - \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
3722 3567 3563,36 3560,42 3520,9	2 2 2 1	 59 ,87 59 ,84 60 ,23	 63,35 63,32 63,75	$3p^{2}D$ — $3d^{2}F^{\circ}$ $3p^{2}D$ — $3d^{2}F^{\circ}$ $4s^{2}S$ — $3d^{2}P^{\circ}$	$ \begin{array}{c} -\\ -\\ 5/2-7/2\\ 3/2-5/2\\ 1/2-3/2 \end{array} $
3502 ,2 3492 ,24 3489 ,84 3425 ,57 3413 ,71	0 1 0 1	60,23 64,30 64,31 54,42 48,38	63 ,77 67 ,85 67 ,86 58 ,04 52 ,01	$4s^{2}S - 3d^{2}P^{\circ}$ $3s'^{2}P^{\circ} - 3p'^{2}D$ $3s'^{2}P^{\circ} - 3p'^{2}D$ $3s^{4}P^{\circ} - 3p^{4}D$ $3p^{2}P^{\circ} - 3d^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3411,76 3409,75 3405,97 3403,58 3396,83	$\begin{array}{c} 4\\2\\-\\3\\2\end{array}$	48,38 54,42 54,39 48,37 54,39	52,01 58,06 58,03 52,01 58,04	$3p {}^{2}P^{\circ} - 3d {}^{2}D$ $3s {}^{4}P^{\circ} - 3p {}^{4}D$ $3s {}^{4}P^{\circ} - 3p {}^{4}D$ $3p {}^{2}P^{\circ} - 3d {}^{2}D$ $3s {}^{4}P^{\circ} - 3p {}^{4}D$	$\begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
3390 ,37 3385 ,55 3381 ,33 3381 ,28 3378 ,09	-6 -4 0	54,37 54,42 54,37 54,39 56,17	58,03 58,08 58,04 58,06 59,84	$3s ^{4}P^{\circ} - 3p ^{4}D$ $3s ^{4}P^{\circ} - 3p ^{4}D$ $3s ^{4}P^{\circ} - 3p ^{4}D$ $3s ^{4}P^{\circ} - 3p ^{4}D$ $3s ^{2}P^{\circ} - 3p ^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
3375,50 3371,38 3363,46 3362,63 3354,31	3 4 6 —	58,79 — 58,79 58,79	62,46 — 62,46 62,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3349 ,11 3348 ,08 3216 ,31 3209 ,64 3199 ,53	3 2 - 3 1	56,17 56,14 58,08 58,08 58,06	59,87 59,84 61,94 61,94 61,93	$3s {}^{2}P^{\circ} - 3p {}^{2}D$ $3s {}^{2}P^{\circ} - 3p {}^{2}D$ $3p {}^{4}D - 3d {}^{4}D^{\circ}$ $3p {}^{4}D - 3d {}^{4}D^{\circ}$ $3p {}^{4}D - 3d {}^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
3194,75 3185,72 3180,98 3180,72 3177,80	0 - 0 0	58,06 58,04 58,04 58,04 58,03	61,94 61,93 61,94 61,94 61,93	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
3071 ,66 3063 ,46 3052 ,54 3028 ,04 2926 ,14	5 6 1 0 1	44,37 44,37 56,17 56,14 57,94	48,37 48,38 60,23 60,23 62,18	$3s^{2}S - 3p^{2}P^{\circ} \ 3s^{2}S - 3p^{2}P^{\circ} \ 3s^{2}P^{\circ} - 4s^{2}S \ 3s^{2}P^{\circ} - 4s^{2}S \ 3p^{2}P - 3d^{2}D^{\circ}$	1/2 - 1/2 $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 3/2$
2921 ,43 2916 ,29 2836 ,25 2829 ,18 2816 ,53	3 2 6 2 4	57,94 57,93 54,42 58,08 58,06	62,48 62,48 58,79 62,46 62,46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
2803 ,60 2787 ,04 2782 ,46	2 8 3	58,06 58,03 58,03	62,48 62,48 62,49	3p ⁴ D—3d ⁴ P° 3p ⁴ D—3d ⁴ P° 3p ⁴ D—3d ⁴ P°	$^{5/2}_{2}$ $^{3/2}_{1/2}$ $^{3/2}_{3/2}$ $^{3/2}_{-1/2}$
2781,05 2724,01	7 2		-	Ξ	_

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2682,41 2677,09 2675,34 2663,22 2662,29	2 2 2 2 2 2	_ _ _ _	_ _ _ _	 	_ _ _ _ _
2632,78 2620,04 2578,24 2553,61 2538,94	4 3 4 2 3	_ _ _ _	 	_ _ _ _ _	_ _ _ _
2531,76 2529,92 2528,08 2517,40 2509,23	2 3 2 7 8			3s 4P°—3p 4P 3s 4P°—3p 4P	$ \begin{array}{c} $
2507,77 2506,56 2504,70 2504,20 2501,84	7 3 5 2 4	54,39 — — — 54,39	59 ,33 — — — 59 ,35	3s 4P°—3p 4P — — — 3s 4P°—3p 4P	3/2—1/2 — — — — 3/2—3/2
2499,29 2497,10 2493,75 2493,40 2459,45 2450,06 2449,36 2384,67 1343,507 1342,995	6 3 10 7 3 10 8 1 7	54,37 	59,33 	$3s ^4P^{\circ} - 3p ^4P$ $ 3s ^4P^{\circ} - 3p ^4P$ $3s ^4P^{\circ} - 3p ^4P$ $ 4d ^2D - 5f ^2F^{\circ}$ $3p^2 ^2P - 2p^3 ^2D^{\circ}$ $2p^2 ^2P - 2p^3 ^2D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1338,603 923,433 923,353 921,364 921,301 802,250 802,198	6 4 6 5 4 5 6	22,38 22,41 22,41 22,38 22,38 20,38 20,38	31,64 35,83 35,83 35,83 35,83 35,83 35,83	$2p^{2} {}^{2}P - 2p^{3} {}^{2}D^{\circ} \ 2p^{2} {}^{2}P - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}S - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}S - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}S - 2p^{3} {}^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
790,203 790,103 787,710 779,997 779,905 779,821 779,734 625,852 625,130	16 13 15 6 10 9 6 14 14	0,05 0,05 0,00 15,74 15,74 15,74 15,74 8,86 8,84	15,74 15,74 15,74 31,63 31,63 31,64 31,64 28,67 28,67	$2p^{2}P^{\circ}-2p^{2} \stackrel{2}{2}D$ $2p^{2}P^{\circ}-2p^{2} \stackrel{2}{2}D$ $2p^{2}P^{\circ}-2p^{2} \stackrel{2}{2}D$ $2p^{2}P^{\circ}-2p^{3} \stackrel{2}{2}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3} \stackrel{2}{2}D^{\circ}$ $2p^{2}P^{\circ}-2p^{3} \stackrel{2}{2}D^{\circ}$ $2p^{2}P^{\circ}-2p^{3} \stackrel{2}{2}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$ $2p^{2}P^{\circ}-2p^{3}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ \frac{3}{2} - 5/2 \\ \frac{3}{2} - 5/2 \\ \frac{5}{2} - 5/2 \\ \frac{3}{2} - 3/2 \\ \frac{5}{2} - \frac{3}{2} \\ \frac{5}{2} - \frac{3}{2} \\ \frac{3}{2} - \frac{3}{2} \end{array} $
624,617 617,033 616,933 609,829 608,395 555,262 554,514 554,074 553,328 471,603	13 7 8 15 14 16 18 17 16 0	8,82 15,74 15,74 0,05 0,05 0,05 0,00 0,00 0,00 31,64	28,67 35,83 35,83 20,38 20,38 22,38 22,41 22,38 22,41 57,93	$\begin{array}{c} 2p^2 & ^4P - 2p^3 & ^4S^\circ \\ 2p^2 & ^2D - 2p^3 & ^2P^\circ \\ 2p^2 & ^2D - 2p^3 & ^2P^\circ \\ 2p & ^2P^\circ - 2p^2 & ^2S \\ 2p & ^2P^\circ - 2p^2 & ^2S \\ 2p^2 & ^2P^\circ - 2p^2 & ^2P \\ 2p & ^2P^\circ - 2p^2 & ^2P \\ 2p^3 & ^2D^\circ - 3p^2P \end{array}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
471 ,273 442 ,873 442 ,705	1 0 1	31,63 20,38 20,38	57,94 48,37 48,38	$2p^{3} {}^{2}D^{\circ} - 3p {}^{2}P$ $2p^{2} {}^{2}S - 3p {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3p {}^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
399,85 399,71	4 2	_	_		_
399,62 399,50 379,919 379,775 367,192	2 3 3 4 2		 48 ,37 48 ,38 56 ,14 56 ,17	$\begin{array}{c} - \\ - \\ 2p^2 \ ^2D - 3p^2 \ P^\circ \\ 2p^2 \ ^2D - 3p \ ^2P^\circ \\ 2p^2 \ ^2P - 3s \ ^2P^\circ \\ 2p^2 \ ^2P - 3s \ ^2P^\circ \end{array}$	$\begin{array}{c} - \\ - \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
346,688 346,372 339,436 339,330 327,519	3 4 0 1 0	20,38 20,38 31,64 31,63 35,83	56,14 56,17 68,16 68,17 73,68	$2p^{2} {}^{2}S - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3s {}^{2}P^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 3p' {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3p' {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4f {}^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
327,320 321,457 311,726 311,679 311,490	1 1 3 6 5	35,83 35,83 22,41 22,41 22,38	73,71 74,40 62,18 62,18 62,18	$2p^{3} {}^{2}P^{\circ} - 4f {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3s''' {}^{2}D$ $2p^{2} {}^{2}P - 3d {}^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2, 3/2 - 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
306 ,882 306 ,621 299 ,850 299 ,710 299 ,620	7 8 4 2 2	15,74 15,74 22,41 22,41 22,38	56,14 56,17 63,75 63,77 63,75	$2p^2 \ ^2D - 3s \ ^2P^\circ \ 2p^2 \ ^2D - 3s^2 \ P^\circ \ 2p^2 \ ^2P - 3d \ ^2P^\circ \ 2p^2 \ ^2P - 3d \ ^2P^\circ \ 2p^2 \ ^2P - 3d \ ^2P^\circ \ $	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
299,495 295,874 295,140 295,051 294,853	3 2 1 1 1	22 ,38 22 ,41 31 ,64 31 ,63 31 ,64	63,77 64,31 73,64 73,65 73,68	$2p^{3} {}^{2}P - 3d {}^{2}P^{\circ} \ 2p^{2} {}^{2}P - 3s' {}^{2}P^{\circ} \ 2p^{3} {}^{2}D^{\circ} - 4f {}^{2}F \ 2p^{3} {}^{2}D^{\circ} - 4f {}^{2}F \ 2p^{3} {}^{2}D^{\circ} - 4f {}^{2}D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 7/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
294 ,650 291 ,203 291 ,054 289 ,933 289 ,898	1 1 1 1 2	31,63 35,83 35,83 31,64 31,63	73 ,71 78 ,41 78 ,43 74 ,40 74 ,40	$2p^{3} {}^{2}D^{\circ} - 4f {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 3s''' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3s''' {}^{2}D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
289,590 289,469 289,292 285,838 285,714	1 2 3 7 6	28,67 28,67 28,67 20,38 20,38	71,48 71,50 71,53 63,75 63,77	$2p^{3} {}^{4}S^{\circ} - 3s'' {}^{4}P$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
282,213 279,937 279,633 279,456 272,311	1 11 10 2 6	20,38 0,05 0,00 35,83 8,86	64,31 44,34 44,34 80,20 54,39	$2p^{2} {}^{2}S - 3s' {}^{2}P^{\circ}$ $2p {}^{2}P^{\circ} - 3s {}^{2}S$ $2p {}^{2}P^{\circ} - 3s {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 3d''' {}^{2}D$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2}, \ 3/_{2} - 3/_{2}, \ 5/_{2} \\ 5/_{2} - 3/_{2} \end{array}$
272,270 272,174 272,125 272,076 271,989	6 7 7 6 6	8,84 8,84 8,86 8,82 8,84	54 ,37 54 ,39 54 ,42 54 ,39 54 ,42	$2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3s {}^{4}P^{\circ}$	3/2 - 1/2 $3/2 - 3/2$ $5/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$
269,559 266,967 266,932 266,729 266,690	1 5 6 0	35,83 15,74 15,74 31,64 31,63	81,82 62,18 62,18 78,12 78,12	$2p^{3} \ ^{2}P^{\circ} - 3d^{m} \ ^{2}S$ $2p^{2} \ ^{2}D - 3d \ ^{2}D^{\circ}$ $2p^{2} \ ^{2}D - 3d \ ^{2}D^{\circ}$ $2p^{3} \ ^{2}D^{\circ} - 3d^{m} \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ} - 3d^{m} \ ^{2}F$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
265,062 260,556 260,389 258,207 258,116	0 9 10 3 2	31,64 15,74 15,74 15,74 15,74	78,42 63,32 63,35 63,75 63,77	$2p^{3} {}^{2}D^{\circ} - 3d'' {}^{2}D$ $2p^{2} {}^{2}D - 3d {}^{2}F^{\circ}$ $2p^{2} {}^{2}D - 3d {}^{2}F^{\circ}$ $2p^{2} {}^{2}D - 3d {}^{2}P^{\circ}$ $2p^{2} {}^{2}D - 3d {}^{2}P^{\circ}$	3/2, $5/2$ — $3/2$, $5/2$ $3/2$ — $5/2$ $5/2$ — $7/2$ $5/2$ — $3/2$ $3/2$ — $1/2$
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
255,252	5	15,74	64,31	$2p^2 ^2D - 3s' ^2P^9$	5/23/2 3/5/
253,082 252,948	$\frac{7}{6}$	$\begin{array}{c} 22,41 \\ 22,38 \end{array}$	71 ,39 72 ,12	$2p^{2} {}^{2}P - 3d' {}^{2}D^{\circ} \ 2p^{2} {}^{2}P - 3d' {}^{2}P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
252,564	6	{ 31,64 31,63	80 ,72	$2p^{3} \ ^{2}D^{\circ} - 3d''' \ ^{2}F$ $2p^{3} \ ^{2}D^{\circ} - 3d''' \ ^{2}F$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
251,148	1	31,63	80 ,72 81 ,00	$2p^{3} {}^{2}D^{\circ} - 3d''' {}^{2}P$	$\frac{\frac{1}{2}}{\frac{3}{2}}$
251,114	1	31,64	81,01	$2p^{3} {}^{2}D^{\circ} - 3d''' {}^{2}P$	$\frac{3}{2}$ $\frac{-1}{2}$
$249,365 \ 249,223$	4 3	22 ,41 22 ,38	72,12 72,12	$\frac{2p^2}{2p^2}\frac{^2P}{^2P}-3d'\frac{^2P}{^2P}$	$\frac{3}{2} \frac{3}{2} \frac{3}{2}$ $\frac{3}{2} \frac{1}{2} \frac{3}{2}$
246,563	4	67, 28	95, 78	$3p^{3} {}^{4}S^{\circ} - 3d'' {}^{4}P$	$^{3}/_{2}$ — $^{5}/_{2}$
246 ,503 246 ,465	3	28 ,67 28 ,67	78,97 78,97	$2^{p}_{p}^{3} {}^{4}S^{\circ} - 3d'' {}^{4}P$ $2^{p}_{p}^{3} {}^{4}S^{\circ} - 3d'' {}^{4}P$	$\frac{3}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{1}{2}$
720, 245	2 1	_	_	<u> </u>	_
242,183 242,140	$\frac{0}{3}$	22 ,41 22 ,41	73,60 73,61	$\frac{2p^2}{2p^2} \frac{^2P}{^2P} - 4d \frac{^2D}{^2D}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
242,045	$\overset{\circ}{2}$	22,38	73,60	$2p^2 ^2P-4d ^2D^{\circ}$	$^{1}/_{2}^{-}$ $^{3}/_{2}^{-}$
240,079	1 0	$\frac{22}{22}$,41	74 ,05 74 ,05	$\frac{2p^2}{2p} \frac{^2P}{^2P} - 3p'' \frac{^2S}{^2S}$	$\frac{3}{2}$ _1 $\frac{1}{2}$ _1 $\frac{1}{2}$ _1
935, 239 239, 592	3	$\begin{array}{c} 22,38 \\ 20,38 \end{array}$	72,12	$2p^{2} {}^{2}S - 3d' {}^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$, $\frac{3}{2}$
573, 238 238, 361	15 14	0 ,05 0 ,00	52 ,01 52 ,01	$2p^{2}P^{\circ}-3d^{2}D 2p^{2}P^{\circ}-3d^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
236,071	1	8,86	61,38	$2p^{2} {}^{4}P - 3d {}^{4}F^{\circ}$	⁵ / ₂ — ⁷ / ₂
234,988	3	15,74	68,50	$2p^{2} {}^{2}D - 5f {}^{2}F^{\circ} \\ 2p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{5}{2}$, $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
233 ,596 233 ,561	6 8	8 ,86 8 ,86	61 ,94 61 ,94	$2p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\begin{array}{c} 7/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array}$
233,521	6	8 ,84	61,93	$2p^2 ^4P - 3d ^4D^\circ$	
233 ,495 233 ,457	7 7	8 ,84 8 ,82	61 ,94 61 ,93	$2p^{2} {}^{4}P - 3d {}^{4}D^{\circ} \ 2p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
231,302	7	8 ,86	62,46	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ} \ 2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{5}{2}$ _2 $\frac{5}{2}$ $\frac{5}{2}$ _3 $\frac{3}{2}$
231 ,240 231 ,200	$\frac{6}{6}$	8 ,86 8 ,84	$62,48 \\ 62,46$	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
231,144	4	8,84	62,48	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{-3}{2}$
231 ,101 231 ,070	6 7	8 ,84 8 ,82	$62,49 \\ 62,48$	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ} \ 2p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
231 ,031	3	8,82	62 , 49	$2p^{2} {}^{4}P - 3d {}^{4}P^{\circ} \ 2p^{2} {}^{2}S - 4d {}^{2}P^{\circ}$	1/2 - 3/2 $1/2 - 1/2$ $1/2 - 3/2$
230 ,755 230 ,682	2 1	20 ,38 20 ,38	74 ,10 74 ,12	$2p^2 {}^2S - 4d {}^2P^\circ$	1/ ₂ —1/ ₂
040, 230	0	22,41	76,30	$2p^2 {}^2P - 3p'' {}^2D^{\circ}$	$^{3}/_{2}$ — $^{5}/_{2}$
229,896 $225,299$	0 5	22,38 15,74	76,30 70,76	$2p^{2} {}^{2}P - 3p'' {}^{2}D^{\circ} \ 2p^{2} {}^{2}D - 3d' {}^{2}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
223,841	Ō	15,74	71,12	$2p^2 \ ^2D$ —4s $^2P^{\circ}$	3/2-1/2
223,728	0 4	15 ,74 15 ,74	71, 15 71, 39	$^{2p^2}_{2p^2}^{2D}$ $-4s^2P^{\circ}_{2p^2}^{2D}$ $-3d'^2D^{\circ}$	$^{5/_{2}$ $^{-3/_{2}}$ $^{3/_{2}}$
777, 222 763, 222	5	15,74	71 ,39	$2p^{2} {}^{2}D - 3d' {}^{2}D^{\circ}$	$^{5}/_{2}$ — $^{5}/_{2}$
648, 221 515, 515	4 0	15,74 20,38	71,67 76,34	$2p^{2} {}^{2}D - 6f {}^{2}F^{\circ} \\ 2p^{2} {}^{2}S - 3p'' {}^{2}P^{\circ}$	$^{5/2}$, $^{3/2}_{}$, $^{5/2}_{-2}$, $^{7/2}_{}$
216,960	0	15,74	72,88	$2p^2 ^2D - 7f ^2F^{\circ}$	⁵ / ₂ — ⁵ / ₂ , ⁷ / ₂
214,290 214,249	1 1	15,74 15,74	73 ,60 73 ,61	$2p^2 \ ^2D - 4d \ ^2D^{\circ} \ 2p^2 \ ^2D - 4d \ ^2D^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
214,209	4	0 ,05	57 ,93	$4p^{2}P^{\circ}-3p^{2}P$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
214,155	6	0,05	57 ,94 57 03	$2_{p}^{2} P^{\circ} - 3_{p}^{2} P$ $2_{p}^{2} P^{\circ} - 3_{p}^{2} P$	$\frac{3}{2}$ _3/2 $\frac{1}{2}$ _1/2
214,032 213,978	5 4	00, 0 00, 0	57 ,93 57 ,94	$2n^{2} P^{\circ} - 3n^{2} P$	$^{1}/_{2}^{-}$ $^{3}/_{2}$
213 ,061	3 3	15,74 15,74	73 ,93 73 ,95	$2p^{2} ^{2}D - 4d ^{2}F^{\circ} \ 2p^{2} ^{2}D - 4d ^{2}F^{\circ}$	$\frac{3\overline{/}_{2}-5\overline{/}_{2}}{5/_{2}-7/_{2}}$
974, 212 578, 212	$\overset{5}{2}$	15,74	74,06	$2p^2 ^2D - 8f ^2F^{\circ}$	$^{5}/_{2}$ — $^{5}/_{2}$, $^{7}/_{2}$
212,808	0	20,38	78,91	$2p^2 {}^2S - 5d {}^2P^{\circ} \ 2p {}^2P^{\circ} - 3p {}^2D$	$^{1}/_{2}$ _ $^{1}/_{2}$, $^{3}/_{2}$ $^{3}/_{2}$ _ $^{3}/_{2}$
207,348 207,239	4 7	0,05 0,05	59 ,84 59 ,87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2

λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
207 ,183 206 ,002	6	0,00 0,05	59,84 60,23	2p ² P°—3p ² D 2p ² P°—4s ² S	$^{1}/_{2}$ _ $^{3}/_{2}$ $^{3}/_{2}$ _ $^{1}/_{2}$
205,842 204,996 204,905 204,708 203,048	0 0 0 0 5	0,00 22,41 22,38 15,74 0,05	60,23 82,88 82,88 76,30 61,11	$2p^{2}P^{\circ}-4s^{2}S$ $2p^{2}{}^{2}P-4d'{}^{2}D^{\circ}$ $2p^{2}{}^{2}P-4d'{}^{2}D^{\circ}$ $2p^{2}{}^{2}P-3p''{}^{2}D^{\circ}$ $2p^{2}{}^{2}D-3p''{}^{2}D^{\circ}$ $2p^{2}P^{\circ}-3p^{2}S$	$\begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2, \ 3/2 - 5/2, \ 3/2 \\ 3/2 - 1/2 \end{array}$
202,891 201,098 201,073 201,022 200,995	4 1 1 0 2	0,00 8,86 8,84 — 8,86	61,11 70,51 70,50 — 70,54	$2p^{2}P^{\circ}-3p^{2}S$ $2p^{2}P^{\circ}-4s^{4}P^{\circ}$ $2p^{2}P^{\circ}-4s^{4}P^{\circ}$ $-2p^{2}P^{\circ}-4s^{4}P^{\circ}$	$\begin{array}{c} {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{5}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ - \\ {}^{5}/_{2} - {}^{5}/_{2} \end{array}$
200,966 200,915 200,827 196,435 196,348	1 1 1 0 0	8 ,82 8 ,84 15 ,74 15 ,74 15 ,74	70,51 70,54 77,47 78,85 78,88	$2p^{2} \stackrel{4P}{-} 4s \stackrel{4P}{-} 4s \stackrel{4P}{-} 2p^{2} \stackrel{4P}{-} 4s \stackrel{4P}{-} 2p^{2} \stackrel{2D}{-} 3p''' \stackrel{2F}{-} 2p^{2} \stackrel{2D}{-} 5d \stackrel{2F}{-} 2p^{2} \stackrel{2D}{-} 3p^{2} \stackrel{2D}{-} 3$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
196,009 195,863 192,244 192,206 192,169	8 7 3 5 4	0,05 0,00 8,86 8,86 8,84	63,30 63,30 73,37 73,37 73,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2 $1/2 - 3/2$ $5/2 - 5/2$ $5/2 - 7/2$ $3/2 - 5/2$
192,139 191,752 191,695 191,640 191,609	4 3 2 0 2	8 ,82 8 ,86 8 ,84 8 ,84 8 ,82	73,37 73,52 73,52 73,52 73,52	$2p^{2} {}^{4}P - 4d {}^{4}D^{\circ} \ 2p^{2} {}^{4}P - 4d {}^{4}P^{\circ} \ 2p^{2} {}^{4}P - 4d {}^{4}P^{\circ}$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 5/_2 \end{array} $
188 ,190 188 ,152 186 ,982 186 ,936 186 ,872	0 2 0 2 1	8 ,86 8 ,86 8 ,86 8 ,86 8 ,84	74,75 74,75 75,18 75,18 75,18	$2p^{2} {}^{4}P - 3p'' {}^{4}D^{\circ}$ $2p^{2} {}^{4}P - 3p'' {}^{4}D^{\circ}$ $2p^{2} {}^{4}P - 3p'' {}^{4}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
185,544 185,384 183,454 183,395 183,353	1 0 1 1 0	 8 ,86 8 ,84 8 ,82	 76 ,44 76 ,44 76 ,44	$\begin{array}{c} - \\ - \\ 2p^2 & ^4P - 3p'' & ^4S^{\circ} \\ 2p^2 & ^4P - 3p'' & ^4S^{\circ} \\ 2p^2 & ^4P - 3p'' & ^4S^{\circ} \end{array}$	$ \begin{array}{c}$
183 ,139 182 ,832 182 ,711 181 ,995 181 ,876	0 4 3 4 3	0,05 0,05 0,00 0,05 0,00	66,87 67,86 67,85 68,17 68,17	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 1/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$ $1/2 - 1/2$, $3/2$
181 ,275 181 ,150 180 ,481 180 ,351 177 ,808	5 4 2 1 2	0,05 0,00 0,05 0,00 8,86	68 ,44 68 ,44 68 ,74 68 ,74 78 ,59	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2 $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $5/2 - 7/2$
177, 761 177, 698 177, 659 177, 598 174, 220	2 1 0 0 3	8,84 8,86 8,84 8,82 0,05	78,59 78,63 78,63 78,63 71,21	$2p^{2} {}^{4}P - 5d {}^{4}D^{\circ}$ $2p^{2} {}^{4}P - 5d {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 5d {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 5d {}^{4}P^{\circ}$ $2p {}^{2}P^{\circ} - 6d {}^{2}D$	3/2 - 7/2, $5/2$ $5/2 - 5/2$ $3/2 - 5/2$ $1/2 - 5/2$ $3/2 - 5/2$
174,105 173,968 173,917 173,851 173,803	2 0 2 1 0	0,00 0,05 0,05 0,00 0,00	71,21 71,31 71,33 71,31 71,33	$2p \ ^{2}P^{\circ}-6d \ ^{2}D$ $2p \ ^{2}P^{\circ}-4p \ ^{2}P$	1/2 - 5/2 $3/2 - 1/2$ $3/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$
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λ, Å	I	E _H , eV	$E_{_{ m B}},{ m eV}$	Transition	J
171 ,191 171 ,121 171 ,071 170 ,988 170 ,940	0 2 2 0 0	0,05 0,05 0,00 8,86 8,84	72 ,47 72 ,50 72 ,47 81 ,37 81 ,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $5/2 - 7/2$ $3/2 - 7/2$
167 ,145 160 ,141 158 ,606 158 ,553 153 ,162	0 0 1 0	8 ,86 0 ,05 0 ,05 0 ,00 0 ,00	83,03 77,92 78,21 78,19 81,01	$2p^{2} {}^{4}P - 7d {}^{4}D^{9}$ $2p {}^{2}P^{\circ} - 5p {}^{2}P$ $2p {}^{2}P^{\circ} - 5p {}^{2}D$ $2p {}^{2}P^{\circ} - 5p {}^{2}D$ $2p {}^{2}P^{\circ} - 3d''' {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
152,355 152,264	0	0,05 0,00	81 ,42 81 ,42	$\frac{2p\ ^{2}P^{\circ}-4p'\ ^{2}D}{2p\ ^{2}P^{\circ}-4p'\ ^{2}D}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$

O V, ground state $1s^2 2s^2 {}^1S_0$ Ionization potential 918702 cm⁻¹; 113,873 eV

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
7437,3 6909,0 6878,5 6830,1 6819,4		89 ,61 85 ,53 85 ,53 85 ,53 85 ,51	91 ,26 87 ,32 87 ,33 87 ,34 87 ,32	$4s {}^{3}S - 4p {}^{3}P^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$ $3p {}^{3}P - 3d {}^{3}D^{\circ}$	1-1 2-1 2-2 2-3 1-1
6789,8 6766,8 6328,6 5607,51 5604,11	_ _ _ _	85,51 85,49 86,43 72,29 72,29	87,33 87,32 88,39 74,50 74,50	$3p \ ^{3}P - 3d \ ^{3}D^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}D^{\circ}$ $3p \ ^{1}D - 3d \ ^{1}F^{\circ}$ $3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3p \ ^{3}P^{\circ} - 3d \ ^{3}D$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-3 \\ 2-1 \\ 2-2 \end{array} $
5597,90 5583,29 5579.93 5572.00 5473,7		72,29 72,29 72,28 72,28 72,28 85,53	74,50 74,50 74,50 74,50 87,79	$3p ^3P^{\circ} - 3d ^3D$ $3p ^3P^{\circ} - 3d ^3D$ $3p ^3P^{\circ} - 3d ^3D$ $3p ^3P^{\circ} - 3d ^3D$ $3p ^3P - 3d ^3P^{\circ}$	$ \begin{array}{c} 2 - 3 \\ 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 2 - 2 \end{array} $
5431,5 5417,4 5376,0 5352,1 5343,3	 	85,53 85,51 85,51 85,51 85,49	87,81 87,79 87,81 87,82 87,81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1 1-2 1-1 1-0 0-1
5114, 2 4554, 28 4522, 2	<u></u>	69,59 83,40 86,43	72 ,01 86 ,12 89 ,17	3s ¹ S-3p ¹ P ° 3p ¹ P-3d ¹ D ° 3p ¹ D-3d ¹ P °	0—1 1—2 2—1
4213.2 4178,2 4158,76 4153,2 4135,9		81,03 81,03 84,82 80,99 84,82	83,97 83,99 87,79 83,97 87,81	3s ³ P°—3p ³ D 3s ³ P°—3p ³ D 3p ³ S—3d ³ P° 3s ³ P°—3p ³ D 3p ³ S—3d ³ P°	2-1 2-2 1-2 1-1 1-1
4125,4 4123,90 4121,7 4119,2 3761,6 3747,1 3726,4	- 2 - - - -	80,97 81,03 84,82 80,99 84,04 84,04 83,99	83,97 84,04 87,82 83,99 87,33 87,34 87,32	$3s \ ^{3}P^{\circ} - 3p \ ^{3}D$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}D$ $3p \ ^{3}S - 3d \ ^{3}P^{\circ}$ $3s \ ^{3}P^{\circ} - 3p \ ^{3}D$ $3p \ ^{3}D - 3d \ ^{3}D^{\circ}$ $3p \ ^{3}D - 3d \ ^{3}D^{\circ}$ $3p \ ^{3}D - 3d \ ^{3}D^{\circ}$	0-1 2-3 1-0 1-2 3-2 3-3 2-1
- · - · y -		•	•	•	160

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
3717,5 3703,3 3702,2	_ _ _	83,99 83,99 89,17	87,33 87,34 92,52	3p 3D—3d 3D° 3p 3D—3d 3D° 3d 1P°—4d 1D	2—2 2—3 1—2
3699,0 3690,2 3298,7 3275,67 3264,7	_ _ _ _	83,97 83,97 84,04 81,03 83,99	87,32 87,32 87,79 84,82 87,79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 1—2 3—2 2—1 2—2
3249, 7 3243, 6 3239, 3 3228, 8 3222, 3 3220, 1	_ _ _ _	83,99 83,97 80,99 83,97 80,97 83,97	87,81 87,79 84,82 87,81 84,82 87,82	$3p ^3D - 3d ^3P^{\circ}$ $3p ^3D - 3d ^3P^{\circ}$ $3s ^3P^{\circ} - 3p ^3S$ $3p ^3D - 3d ^3P^{\circ}$ $3s ^3P^{\circ} - 3p ^3S$ $3p ^3D - 3d ^3P^{\circ}$	2—1 1—2 1—1 1—1 0—1 1—0
3144,68 3058,68 2789,86 2787,03 2781,04	1 0 3 4 5	72,01 82,38 67,83 67,83 67,83	75,95 86,43 72,28 72,28 72,29	$3p ^{1}P^{\circ} - 3d ^{1}D$ $3s ^{1}P^{\circ} - 3p ^{1}D$ $3s ^{3}S - 3p ^{3}P^{\circ}$ $3s ^{3}S - 3p ^{3}P^{\circ}$ $3s ^{3}S - 3p ^{3}P^{\circ}$	1-2 1-2 1-0 1-1 1-2
2769,69 2755,13 2752,24 2743,62 2731,44	1 2 0 0 0	81,03 81,03 80,99 80,99 80,97	85,51 85,53 85,49 85,51 85,51	3s ³ P°—3p ³ P 3s ³ P°—3p ³ P 3s ³ P°—3p ³ P 3s ³ P°—3p ³ P 3s ³ P°—3p ³ P	$\begin{array}{c} 2-1 \\ 2-2 \\ 1-0 \\ 1-1 \\ 0-1 \end{array}$
2729,35 1371,287 774,522 762,001 761,130	1 10 7 10 10	80,99 19,69 19,69 10,24 10,20	85,53 28,73 35,69 26,51 26,49	$\begin{array}{c} 3s ^{3}P^{\circ} - 3p ^{3}P \\ 2p ^{1}P^{\circ} - 2p^{2} ^{1}D \\ 2p ^{1}P^{\circ} - 2p^{2} ^{1}S \\ 2p ^{3}P^{\circ} - 2p^{2} ^{3}P \\ 2p ^{3}P^{\circ} - 2p^{2} ^{3}P \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-0 \\ 2-1 \\ 1-0 \end{array} $
760 ,445 760 ,229 759 ,440 758 ,677 712 ,668	12 10 10 10 3	10,24 10,20 10,18 10,20 10,20	26,54 26,51 26,51 26,54 26,54	$\begin{array}{c} 2p\ ^{3}P^{\circ}-2p^{2}\ ^{3}P \\ 2p\ ^{3}P^{\circ}-2p^{2}\ ^{3}P \\ 2p\ ^{3}P^{\circ}-2p^{2}\ ^{3}P \\ 2p\ ^{3}P^{\circ}-2p^{2}\ ^{3}P \\ 2p^{3}P^{\circ}-2p^{2}\ ^{3}P \end{array}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 0-1 \\ 1-2 \\ 1-2 \end{array} $
629,732 341,391 286,448 270,982 265,550	15 0 6 0 4	0,00 35,69 28,73 26,54 35,69	19,69 72,01 72,01 72,29 82,38	$\begin{array}{c} 2s^{2} {}^{1}S - 2p {}^{1}P^{\circ} \\ 2p^{2} {}^{1}S - 3p {}^{1}P^{\circ} \\ 2p^{2} {}^{1}D - 3p {}^{1}P^{\circ} \\ 2p^{2} {}^{3}P - 3p {}^{3}P^{\circ} \\ 2p^{2} {}^{1}S - 3s {}^{1}P^{\circ} \end{array}$	0-1 $0-1$ $2-1$ $2-2$ $0-1$
248,459 231,823 227,688 227,662 227,636	6 7 5 4 5	19,69 35,69 28,73 26,54 26,51	69,59 89,17 82,38 80,99 80,97	$\begin{array}{c} 2p ^{1}P^{\circ} - 3s ^{1}S \\ 2p^{2} ^{1}S - 3d ^{1}P^{\circ} \\ 2p^{2} ^{1}D - 3s ^{1}P^{\circ} \\ 2p^{2} ^{3}P - 3s ^{3}P^{\circ} \\ 2p^{2} ^{3}P - 3s ^{3}P^{\circ} \end{array}$	1-0 0-1 2-1 2-1 1-0
227,549 227,510 227,468 227,374 222,235	5 7 5 5 3	26,51 26,54 26,49 26,51 35,69	80,99 81,03 80,98 81,03 91,48	$2p^2 ^3P - 3s ^3P^\circ \ 2p^2 ^1S - 4p ^1P^\circ$	$ \begin{array}{c} 1-1 \\ 2-2 \\ 0-1 \\ 1-2 \\ 0-1 \end{array} $
220,352 216,018 215,245 215,104 215,034	13 8 9 8 7	19,69 28,73 10,24 10,20 10,18	75,95 75,95 67,83 67,83 67,83	$2p ^{1}P^{\circ} - 3d ^{1}D$ $2p^{2} ^{1}D - 3d ^{1}D^{\circ}$ $2p ^{3}P^{\circ} - 3s ^{3}S$ $2p ^{3}P^{\circ} - 3s ^{3}S$ $2p ^{3}P^{\circ} - 3s ^{3}S$	1-2 2-2 2-1 1-1 0-1
207,794 205,402 203,935 203,890 203,851	10 3 6 8 6	28 ,73 28 ,73 26 ,54 26 ,54 26 ,51	88,39 89,17 87,33 87,34 87,32	$2p^{2} ^{1}D - 3d ^{1}F^{\circ}$ $2p^{2} ^{1}D - 3d ^{1}P^{\circ}$ $2p^{2} ^{3}P - 3d ^{3}D^{\circ}$ $2p^{2} ^{3}P - 3d ^{3}D^{\circ}$ $2p^{2} ^{3}P - 3d ^{3}D^{\circ}$	2-3 2-1 2-2 2-3 1-1
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λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
203,821	7	26,51	87,33	$2p^2 ^3P - 3d ^3D^{\circ}$	1-2
203,783 202,393	6 7	26,49 26,54	87,32 87,79	$2p^{2} {}^{3}P - 3d {}^{3}D^{\circ} \ 2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	$0-1 \\ 2-2$
335, 202, 335 202, 282	5 5	26 , 54 26 , 51	87 ,81 87 ,79	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ} \ 2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	2—1 1—2
202,226		26,51	87,81	$2p^2 ^3P - 3d ^3P^{\circ}$	1—1
191, 202 202,158	5 5 5	$26,51 \ 26,49$	87 ,82 87 ,81	$2_{p^2}^{p_2} {}^{3}P - 3d {}^{3}P^{\circ} \ 2_{p^2} {}^{3}P - 3d {}^{3}P^{\circ}$	1—0 0—1
198,031 194,593	3 8	19,69		$\frac{1}{2p} \frac{-}{1}P^{\circ} - 3p {}^{1}P$	_ 1—1
192,906	14	10,33	74,50	$2p ^{3}P^{\circ} - 3d ^{3}D$	2—3
192,800 192,751	13 12	10,20 10,18	74,50 74,50	$2p^{3}P^{\circ}-3d^{3}D$ $2p^{3}P^{\circ}-3d^{3}D$	1—2 0—1
191,556	2 1	26,54	91,26 91,26	$2p^{2} {}^{3}P - 4p {}^{3}P^{\circ} \ 2p^{2} {}^{3}P - 4p {}^{3}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
458, 191 191,397	0	26 ,51 26 ,49	91,26	$2p^{2} ^{3}P - 4p ^{3}P^{\circ}$	0—1
185,747 185,455	9	19 ,69 35 ,69	86,43 102,19	$2p {}^{1}P^{\circ} - 3p {}^{1}D \\ 2p^{2} {}^{1}S - 4s {}^{1}P^{\circ}$	$ \begin{array}{c} 1 - 2 \\ 0 - 1 \end{array} $
205, 182	2 2	19,69	87,73	$2p {}^{1}P^{\circ} - 3p {}^{1}S$	1-0
178, 713 174, 558	2 2	35,69 19,69	105 ,07 90 ,71	$2p^{2} {}^{1}S - 4d {}^{1}P^{\circ}$ $2p {}^{1}P^{\circ} - 4s {}^{1}S$	0—1 1—0
172,168	12	0,00	72,01	$2s^{2} {}^{1}S - 3p {}^{1}P^{\circ} 2p {}^{1}P^{\circ} - 4d {}^{1}D$	$\begin{array}{c} 0 - 1 \\ 1 - 2 \end{array}$
170 ,218 169 ,586	$ \begin{array}{c} 5\\0 \end{array} $	19 ,69 —	92,52 —	2p -P -4a -D -	<u>-</u>
478, 469 168, 077	0 4	— 10,24	— 83,99	- 2p ³ P°-3p ³ D	 2_2
168,042	4	10,20	83,97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
167,991	8	$\begin{cases} 10,20 \\ 10,24 \\ 10,42 \end{cases}$	83,99 84,04	$2p^{3}P^{\circ}-3p^{3}D$	2— 3
166,234	5	10,18 10,24	83,97 84,82	$2p^{3}p^{\circ}-3p^{3}D$ $2p^{3}p^{\circ}-3p^{3}S$	$0-1 \\ 2-1$
166,152	4	10,20	84,82	$2^{p} {}^{3}P^{\circ} - 3^{p} {}^{3}S$ $2^{p} {}^{3}P^{\circ} - 3^{p} {}^{3}S$	2—1 0—1
166,113 164,986	$\frac{3}{2}$	10 ,18 28 ,73	84,82 103,87	$2p^{2} {}^{1}D - 4d {}^{1}D^{\circ}$	2—2
164,710 164,656	4 6	10 ,24 10 ,24	85,51 85,53	$2p \ ^{3}P^{\circ} - 3p \ ^{3}P \ 2p \ ^{3}P^{\circ} - 3p \ ^{3}P$	2—1 2—2
164,628	4	10,20	85,51	$2p \ ^{3}P^{\circ} - 3p \ ^{3}P$	1—1
578, 164 164, 178	$rac{5}{2}$	10,20 28,73	85,53 104,24	$2p^{3}P^{\circ} - 3p^{3}P$ $2p^{2}^{1}D - 6f^{1}F^{\circ}$	$\begin{array}{c} 1-2 \\ 2-3 \end{array}$
162,494 159,380	4 4	28,73 $26,54$	105,02 104,33	$2p^{2} {}^{1}D - 4d {}^{1}F^{\circ} \ 2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$	2—3 2—3
159,343	4	26,50	104,31	$2p^2 ^3P - 4d ^3D^{\circ}$	1—2
926, 158 158, 813	2 1	$26,54 \ 26,51$	55, 104 104, 56	$\frac{2p^2}{2p^2} {}^3P - 4d {}^3P^{\circ} \\ 2p^2 {}^3P - 4d {}^3P^{\circ}$	2—2 1—1
156,225 156,158	$\frac{3}{2}$	10,24 10,20	89,59 89,59	$2p^{3}P^{\circ}-4s^{3}S$ $2p^{3}P^{\circ}-4s^{3}S$	2—1 1—1
156,136	1	10,18	89,59	$2p^{3}P^{\circ}-4s^{3}S$	0—1
948, 153 151, 548	$\frac{3}{6}$	19,69 10,24	100 ,22 92 ,04	$\frac{2p}{2p^3} \frac{^1P}{P}^{\circ} - \frac{5d}{3D} \frac{^1D}{P}$	$\begin{array}{c} 1-2 \\ 2-3 \end{array}$
481 , 151	5 4	10,20 10,18	92,04 92,04	$^{2}p^{3}P^{\circ}-4d^{3}D \ ^{2}p^{3}P^{\circ}-4d^{3}D$	$ \begin{array}{c} 1-3, 2, 1 \\ 0-1 \end{array} $
151 ,449 149 ,078	2	19,69	102,85	$2p {}^{1}P^{\circ} - 4p {}^{1}P$	1—1
149 ,034 147 ,261	$\frac{0}{3}$	28,73 19,69	111 ,90 103 ,87	$2p^2 {}^1\!D - 5d {}^1\!D^\circ \ 2p {}^1\!P^\circ - 4p {}^1\!D$	$\begin{array}{c} 2-2 \\ 1-2 \end{array}$
345, 146	1	19 ,69	104 ,4 0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 2—3
144,837 144,802	1	$26,54 \ 26,50$	112,14 112,14	$2p^2 ^3P - 5d ^3D^{\circ}$	1, 0—2, 1
142,119 140,109	$0 \\ 0$	19,69 10,24	92, 106 98, 72	$2p {}^{1}P^{\circ} - 7d {}^{1}D \ 2p {}^{3}P^{\circ} - 5s {}^{3}S$	$ \begin{array}{c} 1-2 \\ 2-1 \end{array} $
140,100	J	10,44	,12	- _F 1 03 0	17

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
140 ,045 139 ,492 139 ,025 138 ,108 138 ,054 138 ,030 135 ,523 133 ,521 133 ,328 132 ,885 132 ,885 132 ,885 132 ,800 131 ,807 131 ,750 128 ,297	0 0 5 4 3 2 5 3 0 0 0 2 1 1	10,18 19,69 0,00 10,24 10,20 10,18 0,00 10,24 10,18 10,24 10,24 10,18 10,24 10,24	98,72 89,17 100,00 — 91,48 103,09 103,18 103,54 103,56 103,54 104,29 104,29 106,86	$\begin{array}{c} 2p\ ^{3}P^{\circ}-5s\ ^{3}S\\ 2p\ ^{1}P^{\circ}-8d\ ^{1}D\\ 2s^{2}\ ^{1}S-3d\ ^{1}P^{\circ}\\ \\ 2p\ ^{3}P^{\circ}-5d\ ^{3}D\\ 2p\ ^{3}P^{\circ}-5d\ ^{3}D\\ 2p\ ^{3}P^{\circ}-5d\ ^{3}D\\ 2s^{2}\ ^{1}S-4p\ ^{1}P^{\circ}\\ 2p\ ^{3}P^{\circ}-4p\ ^{3}D\\ \\ 2p\ ^{3}P^{\circ}-4p\ ^{3}S\\ 2p\ ^{3}P^{\circ}-4p\ ^{3}S\\ 2p\ ^{3}P^{\circ}-4p\ ^{3}P\\ 2p\ ^{3}P^{\circ}-6d\ ^{3}D\\ 2p\ ^{3}P^{\circ}-6d\ ^{3}D\\ 2p\ ^{3}P^{\circ}-6d\ ^{3}D\\ 2p\ ^{3}P^{\circ}-7d\ ^{3}D\\ \end{array}$	1, 0-1 1-2 0-1 2-3 1-2 0-1 0-1 2-3 2-1 1, 0-1 2-1 2-2 0, 1-1, 2 0, 1, 2-1, 2, 3 0, 1, 2-1, 2, 3 2-3
128 ,235 124 ,598	$\frac{0}{3}$	10,24 0,00	106 ,87 99 ,45	$\frac{2p}{2s^2} {}^{3}P^{\circ} - 7d {}^{3}D$ $2s^2 {}^{1}S - 5p {}^{1}P^{\circ}$	0, 1, 2—1, 2, 3
122 ,372 122 ,128	0	10,24 10,24	111,54 111,75	$ \begin{array}{ccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$

O VI, ground state $1s^2 2s \, ^2S_{1/2}$ Ionization potential 1113999,5 cm $^{-1}$; 138,080 eV

λ, Å	I	$E_{\rm H}$, eV	$E_{\rm B}$, eV	Transition	J
5602 5410 5298 5292 5291	_ _ _ _	128,02 128,11 128,12 127,57 128,12	130,24 130,39 130,46 129,90 130,46	$7p^{2}P^{\circ}$ —8s ^{2}S $7d^{2}D$ —8p $^{2}P^{\circ}$ $7f^{2}F^{\circ}$ —8d ^{2}D $7g^{2}G$ —8f $^{2}F^{\circ}$ $7g^{2}G$ etc. —8h $^{2}H^{\circ}$ etc.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
5289 5279 5112 4751 3834 ,24		128,12 128,11 128,02 127,79 79,35	130,46 130,46 130,46 130,39 82,58	$7f ^2F^{\circ} - 8g ^2G$ etc. $7d ^2D - 8f ^2F^{\circ}$ $7p ^2P^{\circ} - 8d ^2D$ $7s ^2S - 8p ^2P^{\circ}$ $3s ^2S - 3p ^2P^{\circ}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
3811 ,35 3622 3509 3438 3434	2 	79,35 124,36 124,49 124,51 124,51	82,60 127,79 128,02 128,11 128,12	$3s^{2}S - 3p^{2}P^{\circ}$ $6p^{2}P^{\circ} - 7s^{2}S$ $6d^{2}D - 7p^{2}P^{\circ}$ $6f^{2}F^{\circ} - 7d^{2}D$ $6g^{2}G - 7h^{2}H^{\circ}$ etc.	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2}, \ 3/_{2} - 1/_{2} \\ 3/_{2}, \ 5/_{2} - 1/_{2}, \ 3/_{2} \\ 5/_{2}, \ 7/_{2} - 3/_{2}, \ 5/_{2} \\ 7/_{2} \ \text{to} \ 11/_{2} - \\ 7/_{2} \ \text{to} \ 13/_{2} \end{array}$
3433 3426 3314 3068 1037,613		124,51 124,49 124,36 123,99 0,00	128 ,12 128 ,12 128 ,11 128 ,02 11 ,95	$6f ^2F^{\circ} - 7g ^2G$ $6d ^2D - 7f ^2F^{\circ}$ $6p ^2P^{\circ} - 7d ^2D$ $6s ^2S - 7p ^2P^{\circ}$ $2s ^2S - 2p ^2P^{\circ}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1031 ,912 519 ,723 519 ,610 498 ,431 498 ,090	10 2 2 1 0	0,00 83,64 83,64 82,60 82,58	12,01 107,50 107,50 107,48 107,47	$\begin{array}{c} 2s {}^{3}S - 2p {}^{2}P^{\circ} \\ 3d {}^{2}D - 4f {}^{2}F^{\circ} \\ 3d {}^{2}D - 4f {}^{2}F^{\circ} \\ 3p {}^{2}P^{\circ} - 4d {}^{2}D \\ 3p {}^{2}P^{\circ} - 4d {}^{2}D \\ \end{array}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
447,840 447,712 184,117	0 0 9	79 ,35 79 ,35 12 ,01	107,03 107,04 79,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
183 ,937 173 ,082 172 ,935 150 ,124 150 ,088 132 ,312 132 ,219	8 13 12 9 10 2	11,95 12,01 11,95 0,00 0,00 12,01 11,95	79,35 83,64 83,64 82,58 82,60 105,71 105,71	$2p \ ^{2}P^{\circ} - 3s^{2} S$ $2p \ ^{2}P^{\circ} - 3d \ ^{2}D$ $2p \ ^{2}P^{\circ} - 3d \ ^{2}D$ $2s \ ^{2}S - 3p \ ^{2}P^{\circ}$ $2s \ ^{2}S - 3p \ ^{2}P^{\circ}$ $2p \ ^{2}P^{\circ} - 4s \ ^{2}S$ $2p \ ^{2}P^{\circ} - 4s \ ^{2}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
129,872 129,786 116,419 116,347 115,824	6 5 2 1 4	12,01 11,95 12,01 11,95 0,00	107,48 107,47 118,50 118,50 107,04	$2p \cdot P - 4s \cdot S$ $2p \cdot P^{\circ} - 4d \cdot 2D$ $2p \cdot P^{\circ} - 4d \cdot 2D$ $2p \cdot P^{\circ} - 5d \cdot 2D$ $2p \cdot P^{\circ} - 5d \cdot 2D$ $2s \cdot 2S - 4p \cdot 2P^{\circ}$	1/2 - 1/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$, $3/2$
110 ,824 110 ,220 110 ,148 104 ,811	1 0 0 2	12,01 11,95 - 0,00	124,49 124,49 — 118,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{3/2}_{1/2}$ $^{5/2}_{1/2}$ $^{3/2}_{2}$ $^{-1/2}_{2}$ $^{3/2}_{2}$

O VII, ground state $1s^2$ 1S_0 Ionization potential cm $^{-1}$; 739,114 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J
128,500 128,412 120,331 21,804 21,602	0 00 00 —	568,66 568,58 561,04 0,00 0,00	665,14 665,14 664,07 568,59 573,91	$2p\ ^{3}P^{\circ}$ 3 $d\ ^{3}D$ $2p\ ^{3}P^{\circ}$ 3 $d\ ^{3}D$ $2s\ ^{3}S$ 3 $p\ ^{3}P^{\circ}$ $1s^{2}\ ^{1}S$ 2 $p\ ^{3}P^{\circ}$ $1s^{2}\ ^{1}S$ 2 $p\ ^{1}P^{\circ}$	$\begin{array}{c} 1, \ 2-3 \\ 0-2, \ 1 \\ 1-2, \ 1, \ 0 \\ 0-1 \\ 0-1 \end{array}$
18,627 17,768 17,396 17,200	_ _ _	00,00 00,00 00,00 00,0	665,58 697,76 712,68 720,80	$1s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 5p {}^{1}P^{\circ}$ $1s^{2} {}^{1}S - 6p {}^{1}P^{\circ}$	0—1 0—1 0—1 0—1

FLUORINE, Z = 9

F I, ground state $1s^22s^22p^{5} {}^2P^0_{3/2}$ Ionization potential 140524,5 cm $^{-1}$; 17,422 eV

	_ F		1	- , - · , · · · · · · · · · · · · · ·	<u> </u>
λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
11557,47 11544,65 11480,22 11473,70 11414,20	5 2 1 3 1,5	14,50 14,58 14,61 14,53 14,54	15,58 15,66 15,69 15,61 15,63	$3p ^4D^{\circ}$ — $4s ^4P$ $3p ^2D^{\circ}$ — $4s ^2P$ $3p ^2D^{\circ}$ — $4s ^2P$ $3p ^4D^{\circ}$ — $4s ^4P$ $3p ^4D^{\circ}$ — $4s ^4P$	7/2 $5/2$ $5/2$ $3/2$ $3/2$ $1/2$ $5/2$ $3/2$ $1/2$
10940,37 10924,81 10883,28 10862,31 10769,43	$\begin{array}{c} 4 \\ 2,5 \\ 2,5 \\ 20 \\ 4 \end{array}$	14,76 14,75 14,75 14,75 14,75	15,90 15,88 15,88 15,88 15,90	$3p ^{2}P^{\circ}$ — $3d ^{2}D$ $3p ^{2}P^{\circ}$ — $3d ^{4}D$ $3p ^{2}P^{\circ}$ — $3d ^{4}D$ $3p ^{2}P^{\circ}$ — $3d ^{2}D$ $3p ^{2}P^{\circ}$ — $3d ^{2}D$	$\begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
10592,28 10588,71 10490,21 10431,92 10426,29	2 5 1 1 6	14,76 14,76 14,76 14,75 14,75	15,93 15,93 15,94 15,93 15,93	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
10417,29 10380,84 10332,95 10293,01 10287,96	7 7 2,5 3,5 1,5	14,39 14,76 14,75 14,68 14,68	15,58 15,96 15,94 15,88 15,88	$3p ^{2}P^{\circ}$ — $3d ^{4}F$ $3p ^{2}P^{\circ}$ — $3d ^{2}P$ $3p ^{2}P^{\circ}$ — $3d ^{4}F$ $3p ^{4}S^{\circ}$ — $3d ^{2}D$ $3p ^{2}S^{\circ}$ — $3d ^{4}D$	3/2 - 5/2 $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 3/2$
10285,45 10270,75 10241,98 10226,82 10222,50	15 4 4 3 2	14,37 14,40 14,75 14,75 14,68	15,58 15,61 15,96 15,96 15,89	$3p ^4P^{\circ}$ — $4s ^4P$ $3p ^4P^{\circ}$ — $4s ^4P$ $3p ^2P^{\circ}$ — $3d ^2F$ $3p ^2P^{\circ}$ — $3d ^2P$ $3s ^2S^{\circ}$ — $3d ^4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
10209,57 10186,15 10163,50 10087,13 10074,17	4 5 3 6 1	14,68 14,68 14,39 14,68 14,40	15,90 15,90 15,61 15,91 15,63	$3p {}^{4}S^{\circ} - 3d {}^{2}D$ $3p {}^{2}S^{\circ} - 3d {}^{2}D$ $3p {}^{4}P^{\circ} - 4s {}^{4}P$ $3p {}^{4}S^{\circ} - 3d {}^{4}P$ $3p {}^{4}P^{\circ} - 4s {}^{4}P$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
10064,25 10038,03 9970,92 9905,65 9902,65	$egin{array}{c} 4 \\ 4 \\ 4 \\ 1,5 \\ 12 \end{array}$	14,68 14,37 14,39 14,68 14,68	15,91 15,61 15,63 15,93 15,93	$3p ^{2}S^{\circ}$ — $3d ^{4}P$ $3p ^{4}P^{\circ}$ — $4s ^{4}P$ $3p ^{4}P^{\circ}$ — $4s ^{4}P$ $3p ^{4}S^{\circ}$ — $3d ^{2}P$ $3p ^{4}S^{\circ}$ — $3d ^{4}P$	$^{1/}_{2}$
9883,58 9822,11 9794,80 9753,57 9736,70	8 15 6 1,5 9	14,68 14,68 14,68 14,61 14,61	15,93 15,94 15,94 15,88 15,88	$3p \ ^2S^{\circ} - 3d \ ^2P$ $3p \ ^4S^{\circ} - 3d \ ^4P$ $3p \ ^2S^{\circ} - 3d \ ^4F$ $3p \ ^2D^{\circ} - 3d \ ^4D$ $3p \ ^2D^{\circ} - 3d \ ^2D$	$ \begin{array}{c} 1/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \end{array} $
9734,34 9720,57 9699,40 9662,04 9574,80	25 1 7 12 3	14,68 14,68 14,68 14,61 14,58	15,96 15,96 15,96 15,90 15,88	$3p {}^{4}S^{\circ} - 3d {}^{2}F$ $3p {}^{4}S^{\circ} - 3d {}^{2}P$ $3p {}^{2}S^{\circ} - 3d {}^{2}P$ $3p {}^{2}D^{\circ} - 3d {}^{2}D$ $3p {}^{2}D^{\circ} - 3d {}^{4}D$	$ \begin{array}{c} 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 7/_2 \end{array} $
9552,99 9552,30 9505,30 9433,67 9389,47	0,7 0,7 25 200 0,8	14,58 14,61 14,58 14,58 14,61	15,88 15,91 15,88 15,90 15,93	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
9386,75 9384,96 9314,34	2,5 40 60	14,61 14,61 14,61	15,93 15,93 15,94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
9262,69	8	14 ,55	15,89	3p ⁴ D°—3d ⁴ D	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
9244,57	15	14 ,54	15,88	3p ⁴ D°—3d ⁴ D	
9235,38	50	14,61	15,96	$3p ^2D^{\circ} - 3d ^2F$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
9232,85	6	14,55	15,90	$3p ^4D^{\circ} - 3d ^2D$	
9229,40	2,5	14,54	15,88	$3p ^4D^{\circ} - 3d ^2D$	
9223,05	6	14,61	15,96	$3p ^2D^{\circ} - 3d ^2P$	
9191,65	10	14,54	15,89	$3p ^4D^{\circ} - 3d ^4D$	
9178,68	350	14,58	15,93	$3p ^2D^{\circ}$ — $3d ^4F$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
9169,76	3	14,58	15,93	$3p ^2D^{\circ}$ — $3d ^4F$	
9162,33	2	14,54	15,90	$3p ^4D^{\circ}$ — $3d ^2D$	
9151,78	180	14,53	15,88	$3p ^4D^{\circ}$ — $3d ^4D$	
9132,53	1,4	14,55	15,91	$3p ^4D^{\circ}$ — $3d ^4P$	
9122,63	40	14,53	15,88	$3p ^4D^{\circ} - 3d ^4D$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
9107,87	10	14,53	15,88	$3p ^4D^{\circ} - 3d ^2D$	
9102,33	50	14,58	15,94	$3p ^2D^{\circ} - 3d ^4P$	
9097,49	3,5	14,58	15,94	$3p ^2D^{\circ} - 3d ^4F$	
9042,10	400	14,53	15,90	$3p ^4D^{\circ} - 3d ^2F$	
9025,49	350	14,50	15,88	$3p ^4D^{\circ} - 3d ^4D$	7/2 - 7/2 $5/2 - 3/2$ $7/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$
9015,19	0,7	14,58	15,96	$3p ^2D^{\circ} - 3d ^2P$	
9006,19	50	14,50	15,88	$3p ^4D^{\circ} - 3d ^4D$	
8983,65	3,5	14,55	15,93	$3p ^4D^{\circ} - 3d ^2P$	
8981,18	12	14,55	15,93	$3p ^4D^{\circ} - 3d ^4P$	
8963,66 8936,61 8916,89 8914,43 8912,78	0,7 2 7 300	14,50 12,98 14,54 14,54 14,54	15,88 14,37 15,93 15,93 15,93	$3p ^4D^{\circ} - 3d ^2D$ $3s ^2P - 3p ^4P^{\circ}$ $3p ^4D^{\circ} - 3d ^2P$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4F$	$\begin{array}{c} 7/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
8910,27	140	14,55	15,94	$3p ^4D^{\circ} - 3d ^4F$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 7/_{2} - 9/_{2} \\ 7/_{2} - 7/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
8900,92	1000	14,50	15,90	$3p ^4D^{\circ} - 3d ^4F$	
8899,92	60	14,50	15,90	$3p ^4D^{\circ} - 3d ^2F$	
8849,06	70	14,54	15,94	$3p ^4D^{\circ} - 3d ^4P$	
8844,502	120	14,54	15,94	$3p ^4D^{\circ} - 3d ^4F$	
8831,232	100	14,55	15,96	$3p ^4D^{\circ} - 3d ^2P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 5/_{2} \\ 7/_{2} - 9/_{2} \\ 5/_{2} - 7/_{2} \end{array} $
8807,582	900	14,53	15,93	$3p ^4D^{\circ} - 3d ^4F$	
8799,36	70	14,53	15,93	$3p ^4D^{\circ} - 3d ^4F$	
8792,50	35	17,06	18,47	$3p' ^2F^{\circ} - 3d' ^2G$	
8785,63	14	17,06	18,47	$3p' ^2F^{\circ} - 3d' ^2G$	
8777,73 8766,61 8737,270 8732,80 8672,62	120 10 140 6 35	14,54 14,54 14,53 14,53 14,50	15,96 15,96 15,94 15,94 15,93	$3p ^4D^{\circ} - 3d ^2F$ $3p ^4D^{\circ} - 3d ^2P$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4F$ $3p ^4D^{\circ} - 3d ^4F$	3/2 $5/2$ $3/2$ $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $7/2$ $7/2$
8667,71 8664,63 8656,93 8612,58 8606,06	1 6 0,8 6 6	14,53 14,50 14,53 —	15,96 15,93 15,96 —	3p ⁴ D°—3d ² F 3p ⁴ D°—3d ⁴ F 3p ⁴ D°—3d ² P —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8604,47	1,4	14,50	15,94	$3p ^4D^{\circ} - 3d ^4P$	7/2 - 5/2 $7/2 - 5/2$ $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$
8537,04	7	14,50	15,96	$3p ^4D^{\circ} - 3d ^2F$	
8345,556	120	14,40	15,88	$3p ^4P^{\circ} - 3d ^4D$	
8302,40	600	14,40	15,89	$3p ^4P^{\circ} - 3d ^4D$	
8298,581	2000	14,39	15,88	$3p ^4P^{\circ} - 3d ^4D$	
8278,44	2	14,40	15,90	$3p ^4P^{\circ} - 3d ^2D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
8274,615	1500	14,39	15,88	$3p ^4P^{\circ} - 3d ^4D$	
8262,49	12	14,39	15,88	$3p ^4P^{\circ} - 3d ^2D$	
8232,19	500	14,39	15,89	$3p ^4P^{\circ} - 3d ^4D$	
8230,773	3000	14,37	15,88	$3p ^4P^{\circ} - 3d ^4D$	
8214,726	2500	14,37	15,88	$3p$ 4P ° $-3d$ 4D	⁵ / ₂ — ⁵ / ₂

$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
14,39	15,90	3p ⁴ P°—3d ² D	3/2 - 3/2 $1/2 - 1/2$ $5/2 - 3/2$ $5/2 - 5/2$
14,40	15,91	3p ⁴ P°—3d ⁴ P	
14,37	15,88	3p ⁴ P°—3d ⁴ D	
14,37	15,88	3p ⁴ P°—3d ² D	
13,02	14,54	$3s^{2}P - 3p^{4}D^{\circ}$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 5/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 1/_2 - 3/_2 \end{array} $
14,39	15,89	$3p^{4}P^{\circ} - 3d^{4}P$	
14,37	15,90	$3p^{4}P^{\circ} - 3d^{2}D$	
14,40	15,93	$3p^{4}P^{\circ} - 3d^{2}P$	
14,40	15,93	$3p^{4}P^{\circ} - 3d^{4}P$	
12,98	14,53	$3s^{2}P - 3p^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
14,40	15,94	$3p^{4}P^{\circ} - 3d^{4}F$	
14,39	15,93	$3p^{4}P^{\circ} - 3d^{2}P$	
14,39	15,93	$3p^{4}P^{\circ} - 3d^{4}P$	
14,39	15,93	$3p^{4}P^{\circ} - 3d^{4}F$	
14,39 14,40 14,39 12,98	 15,94 15,96 15,94 14,54	$\begin{array}{c} - \\ 3p \ ^4P^{\circ} - 3d \ ^4P \\ 3p \ ^4P^{\circ} - 3d \ ^2P \\ 3p \ ^4P^{\circ} - 3d \ ^4F \\ 3s \ ^2P^{\circ} - 3p \ ^4D^{\circ} \end{array}$	$ \begin{array}{c}$
14,37	15,93	$3p ^4P^{\circ} - 3d ^4F$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
14,37	15,93	$3p ^4P^{\circ} - 3d ^4P$	
14,37	15,93	$3p ^4P^{\circ} - 3d ^4F$	
14,39	15,96	$3p ^4P^{\circ} - 3d ^2F$	
14,39	15,96	$3p ^4P^{\circ} - 3d ^2P$	
14,37 14,37 14,37 —	15,94 15,94 15,96 —	$3p \ ^4P^{\circ} - 3d \ ^4P$ $3p \ ^4P^{\circ} - 3d \ ^4F$ $3p \ ^4P^{\circ} - 3d \ ^2F$ $ 3p \ ^4P^{\circ} - 3d \ ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
13,02	14,61	$3s {}^{2}P - 3p {}^{2}D^{\circ}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
12,98	14,58	$3s {}^{2}P - 3p {}^{2}D^{\circ}$	
12,98	14,61	$3s {}^{2}P - 3p {}^{2}D^{\circ}$	
12,75	14,39	$3s {}^{4}P - 3p {}^{4}P^{\circ}$	
12,73	14,37	$3s {}^{4}P - 3p {}^{4}P^{\circ}$	
12,75	14,40	3s ⁴ P-3p ⁴ P°	$\begin{array}{c} 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
13,02	14,68	3s ² P-3p ² S°	
12,73	14,39	3s ⁴ P-3p ⁴ P°	
13,02	14,68	3s ² P-3p ⁴ S°	
12,73	14,40	3s ⁴ P-3p ⁴ P°	
12,70	14,37	$3s ^4P - 3p ^4P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
12,70	14,39	$3s ^4P - 3p ^4P^{\circ}$	
14,75	16,44	$3p ^2P^{\circ} - 5s ^4P$	
15,36	17,06	$3s' ^2D - 3p' ^2F^{\circ}$	
15,36	17,06	$3s' ^2D - 3p' ^2F^{\circ}$	
15,36 12,98 14,75 13,02	14,68 17,06 14,68 16,46 14,75	3s' 2D-3p' 2F° 3s 2P-3p 4S° 3p 2P°-5s 4P 3s 2P-3p 2P°	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
13,02	14,76	$3s^{2}P - 3p^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
14,75	16,49	$3p^{2}P^{\circ} - 5s^{2}P$	
12,98	14,75	$3s^{2}P - 3p^{2}P^{\circ}$	
14,68	16,46	$3p^{4}S^{\circ} - 5s^{4}P$	
14,68	16,46	$3p^{2}S^{\circ} - 5s^{4}P$	
12,98	14,76	$3s^{2}P - 3p^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
12,75	14,54	$3s^{4}P - 3p^{4}D^{\circ}$	
12,73	14,53	$3s^{4}P - 3p^{4}D^{\circ}$	
12,75	14,55	$3s^{4}P - 3p^{4}D^{\circ}$	
12,70	14,50	$3s^{4}P - 3p^{4}D^{\circ}$	
	14,39 14,40 14,37 14,37 13,02 14,39 14,40 12,98 14,40 14,39 14,39 14,39 14,39 14,39 14,39 14,39 14,37 14,75 15,36 12,98 12,73 12,73 12,70 14,75 15,36 12,98 14,75 15,36 12,98 14,75 15,36 12,98 14,75 15,36 12,98 14,75 15,36 12,98 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 13,02 14,75 13,02 14,75 15,36 12,98 14,75 13,02 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 13,02 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 13,02 14,75 13,02 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 13,02 14,75 13,02 14,75 13,02 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 15,36 15,36 12,98 14,75 13,02 14,75 12,78	14,39	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	EB, eV	Transition	J
6837,74 6834,264 6825,56 6811,67 6806,85	5 9000 15 1 10	14,75 12,73 14,75 14,75 14,75	16,56 14,54 16,56 16,56 16,57	$3p^{2}P^{\circ}$ — $4d^{4}D$ $3s^{4}P$ — $3p^{4}D^{\circ}$ $3p^{2}P^{\circ}$ — $4d^{2}D$ $3p^{2}P^{\circ}$ — $4d^{4}D$ $3p^{2}P^{\circ}$ — $4d^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
6795,528 6773,984 6767,007 6766,54 6763,325	1500 7000 50 5 5	12,73 12,70 15,36 15,36 15,36	14,55 14,53 17,20 17,20 17,20	$\begin{array}{c} 3s ^4P - 3p ^4D^{\circ} \\ 3s ^4P - 3p ^4D^{\circ} \\ 3s' ^2D - 3p' ^2D^{\circ} \\ 3s' ^2D - 3p' ^2D^{\circ} \\ 3s' ^2D - 3p' ^2D^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
6762,934 6741,90 6737,76 6708,282 6690,481	70 1 6 400 1800	15,36 14,76 14,76 12,70 12,73	17,20 16,60 16,60 14,54 14,58	3s' ² D-3p' ² D° 3p ² P°-4d ² P 3p ² P°-4d ⁴ P 3s ⁴ P-3p ⁴ D° 3s ⁴ P-3p ² D°	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
6667,00 6660,62 6651,97 6650,405 6649,51	7 12 0,5 400 6	14,75 14,76 14,75 12,75 14,75	16,60 16,62 16,61 14,61 16,61	$3p \ ^{2}P^{\circ}-4d \ ^{4}F$ $3p \ ^{2}P^{\circ}-4d \ ^{2}P$ $3p \ ^{2}P^{\circ}-4d \ ^{4}P$ $3s \ ^{4}P-3p \ ^{2}D^{\circ}$ $3p \ ^{2}P^{\circ}-4d \ ^{4}F$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
6611,04 6609,55 6607,73 6604,86 6599,725	5 2,5 2,5 0,6 6	14,58 14,61 14,68 14,61 14,75	16,46 16,49 16,56 16,49 16,62	$3p \ ^{2}D^{\circ}-5s \ ^{4}P$ $3p \ ^{2}D^{\circ}-5s \ ^{2}P$ $3p \ ^{4}S^{\circ}-4d \ ^{4}D$ $3p \ ^{2}D^{\circ}-5s \ ^{4}P$ $3p \ ^{2}P^{\circ}-4d \ ^{2}F$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
6596,90 6596,35 6589,21 6583,36 6580,389	0,8 8 4 2 300	14,75 14,68 14,68 14,68 12,73	16,62 16,56 16,56 16,56 14,61	$3p ^2P^{\circ} - 4d ^2P$ $3p ^4S^{\circ} - 4d ^2D$ $3p ^2S^{\circ} - 4d ^4D$ $3p ^4S^{\circ} - 4d ^4D$ $3s ^4P - 3p ^2D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
6578,871 6573,61 6569,694 6569,14 6563,59	12 5 450 7 7	14,68 14,68 12,70 14,68 14,68	16,57 16,56 14,58 16,57 16,57	$3p {}^{4}S^{\circ} - 4d {}^{2}D$ $3p {}^{2}S^{\circ} - 4d {}^{4}D$ $3s {}^{4}P - 3p {}^{2}D^{\circ}$ $3p {}^{2}S^{\circ} - 4d {}^{2}D$ $3p {}^{4}S^{\circ} - 4d {}^{4}P$	3/2 - 3/2 $1/2 - 1/2$ $5/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$
6553,93 6512,71 6502,08 6478,45 6476,39	6 12 18 8 7	14,68 14,61 14,58 14,53 14,54	16,57 16,52 16,49 16,44 16,46	$3p {}^{2}S^{\circ}-4d {}^{4}P$ $3p {}^{2}D^{\circ}-5s {}^{2}P$ $3p {}^{2}D^{\circ}-5s {}^{2}P$ $3p {}^{4}D^{\circ}-5s {}^{4}P$ $3p {}^{4}D^{\circ}-5s {}^{4}P$	1/2 - 1/2 $3/2 - 1/2$ $5/2 - 3/2$ $5/2 - 5/2$ $3/2 - 3/2$
6463,50 6457,06 6453,32 6448,14 6447,69	70 0,8 10 0,6 6	12,70 14,68 14,68 14,68 14,68	14,61 16,60 16,60 16,60 16,60	$3s ^4P - 3p ^2D^{\circ}$ $3p ^4S^{\circ} - 4d ^2P$ $3p ^4S^{\circ} - 4d ^4P$ $3p ^4S^{\circ} - 4d ^4F$ $3p ^2S^{\circ} - 4d ^2P$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
6434 ,11 6422 ,87 6422 ,43 6416 ,31 6413 ,651	15 2,5 7 18 8000	14,68 12,75 14,68 14,53 12,75	16,61 14,68 16,61 16,46 14,68	$3p {}^{4}S^{\circ} - 4d {}^{4}P$ $3s {}^{4}P - 3p {}^{2}S^{\circ}$ $3p {}^{2}S^{\circ} - 4d {}^{4}F$ $3p {}^{4}D^{\circ} - 5s {}^{4}P$ $3s {}^{4}P - 3p {}^{4}S^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6405,171 6385,17 6373,33 6371,77 6367,43	60 10 2 2 10	14,50 14,68 14,68 14,54 14,54	16,44 16,62 16,62 16,49 16,49	$3p ^4D^{\circ} - 5s ^4P$ $3p ^4S^{\circ} - 4d ^2F$ $3p ^2S^{\circ} - 4d ^2P$ $3p ^4D^{\circ} - 5s ^2P$ $3p ^4P^{\circ} - 5s ^4P$	$\begin{array}{c} 7/_2 - 5/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 1/_2 \end{array}$
6365,84 6363,34 6348,508	0,8 8 10000	14,61 14,61 12,73	16,56 16,56 14,68	3p ² D°—4d ⁴ D 3p ² D°—4d ² D 3s ⁴ P—3p ⁴ S°	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $

λ, Å	I	$E_{ m H}$, eV	EB, eV	Transition	J
6314,74 6313,61	0,8	14,55 14,53	16,52 16,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1}/_{2}$ — $^{1}/_{2}$ $^{5}/_{2}$ — $^{3}/_{2}$
6279,028 6263,696 6254,690 6239,651 6230,11	9 18 80 13000 3	14,58 14,58 14,58 12,70 14,61	16,56 16,56 16,56 14,68 16,60	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
6225,356 6212,249 6210,87 6166,628 6164,136	18 18 400 25 1,5	14,61 14,61 12,75 14,61 14,61	16,60 16,61 14,75 16,62 16,62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
6155,359	1	12,75	14,76	$3s ^4P - 3p ^2P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
6152,55	2	14,54	16,56	$3p ^4D^{\circ} - 4d ^4D$	
6149,76	800	12,73	14,75	$3s ^4P - 3p ^2P^{\circ}$	
6145,029	8	14,54	16,56	$3p ^4D^{\circ} - 4d ^4D$	
6133,220	70	14,58	16,60	$3p ^2D^{\circ} - 4d ^4F$	
6131,43	1	14,54	16,56	$3p ^4D^{\circ}-4d ^4D$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
6129,93	1	14,58	16,60	$3p ^2D^{\circ}-4d ^4F$	
6127,49	0,6	14,54	16,57	$3p ^4D^{\circ}-4d ^2D$	
6117,222	10	14,58	16,61	$3p ^2D^{\circ}-4d ^4P$	
6098,34	25	14,53	16,56	$3p ^4D^{\circ}-4d ^4D$	
6090,902	6	14,53	16,56	$3p ^4D^{\circ}$ — $4d ^4D$	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
6088,61	2,5	14,53	16,56	$3p ^4D^{\circ}$ — $4d ^2D$	
6080,113	100	14,53	16,56	$3p ^4D^{\circ}$ — $4d ^2F$	
6052,19	1	14,55	16,60	$3p ^4D^{\circ}$ — $4d ^2P$	
6048,80	1	14,55	16,60	$3p ^4D^{\circ}$ — $4d ^4P$	
6047,54	900	12,70	14,75	$3s ^{4}P - 3p ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
6038,944	18	14,39	16,44	$3p ^{4}P^{\circ} - 5s ^{4}P$	
6038,04	80	14,50	16,56	$3p ^{4}D^{\circ} - 4d ^{4}D$	
6033,34	8	14,50	16,56	$3p ^{4}D^{\circ} - 4d ^{4}D$	
6029,95	20	14,55	16,61	$3p ^{4}D^{\circ} - 4d ^{4}F$	
6021,91	10	14,40	16,46	$3p ^4P^{\circ} - 5s ^4P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
6018,47	1	14,54	16,60	$3p ^4D^{\circ} - 4d ^4P$	
6015,828	150	14,50	16,56	$3p ^4D^{\circ} - 4d ^4F$	
6014,03	40	14,54	16,60	$3p ^4D^{\circ} - 4d ^4F$	
6001,78	8	14,54	16,61	$3p ^4D^{\circ} - 4d ^4P$	
5999 ,753	15	14,54	16,61	$3p ^4D^{\circ}$ — $4d ^4F$	3/2 $3/2$ $5/2$ $5/2$ $5/2$ $1/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$
5994 ,425	50	14,37	16,44	$3p ^4P^{\circ}$ — $5s ^4P$	
5986 ,635	30	14,55	16,62	$3p ^4D^{\circ}$ — $4d ^2P$	
5984 ,94	1,5	14,39	16,46	$3p ^4P^{\circ}$ — $5s ^4P$	
5969 ,056	1	14,75	16,82	$3p ^2P^{\circ}$ — $6s ^4P$	
5965,28 5962,166 5959,187 5956,87 5950,147	$70 \\ 3 \\ 25 \\ 2 \\ 12$	14,53 14,53 14,54 14,54 14,53	16,60 16,60 16,62 16,62 16,61	3p ⁴ D°—4d ⁴ F 3p ⁴ D°—4d ⁴ F 3p ⁴ D°—4d ² F 3p ⁴ D°—4d ² P 3p ⁴ D°—4d ⁴ P	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
5941 ,179	5	14,37	16,46	3p ⁴ P°—5s ⁴ P	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5940 ,697	5	17,06	19,15	3p' ² F°—4d' ² G	
5937 ,56	2,5	17,06	19,15	3p' ² F°—4d' ² G	
5931 ,39	6	14,40	16,49	3p ⁴ P°—5s ² P	
5927 ,60	1	14,40	16,49	3p ⁴ P°—5s ⁴ P	
5903,06	0,8	14,50	16,60	$3p ^4D^{\circ}$ $-4d ^4F$	7/2— $7/2$ $3/2$ — $1/2$ $5/2$ — $3/2$ $3/2$ — $5/2$ $1/2$ — $3/2$
5891,74	8	14,39	16,49	$3p ^4P^{\circ}$ $-5s ^4P$	
5853,06	2,5	14,37	16,49	$3p ^4P^{\circ}$ $-5s ^2P$	
5827,48	0,6	14,75	16,87	$3p ^2P^{\circ}$ $-5d ^2D$	
5785,45	0,5	14,68	16,82	$3p ^2S^{\circ}$ $-6s ^4P$	
5734,39 178	3	14,40	16,56	$3p$ 4P ° $-4d$ 4D	$^{1}/_{2}$ $^{-3}/_{2}$

λ, λ	I	$E_{_{ m H}}$, eV	E _R , eV	Transition	J
5722,59 5719,16 5707,62 5707,31	$\begin{array}{c} & 6 \\ 4,5 \\ & 2 \\ 25 \end{array}$	14,40 14,40 14,40 14,39	16,56 16,57 16,57 16,56	$\begin{array}{c} 3p \ ^{4}P^{\circ}-4d \ ^{4}D \\ 3p \ ^{4}P^{\circ}-4d \ ^{2}D \\ 3p \ ^{4}P^{\circ}-4d \ ^{4}P \\ 3p \ ^{4}P^{\circ}-4d \ ^{4}D \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
5700,82 5689,14 5685,74 5674,39 5671,668	25 18 8 8 90	14,39 14,39 14,39 14,39 14,37	16,56 16,56 16,57 16,57 16,56	$3p ^4P^{\circ}$ — $4d ^4D$ $3p ^4P^{\circ}$ — $4d ^4D$ $3p ^4P^{\circ}$ — $4d ^2D$ $3p ^4P^{\circ}$ — $4d ^4P$ $3p ^4P^{\circ}$ — $4d ^4D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
5667,532 5661,106 5659,15 5652,601 5646,254	40 7 15 0,5 8	14,37 14,37 14,37 14,68 14,37	16,56 16,56 16,56 16,87 16,57	$3p ^{4}P^{\circ}-4d ^{4}D$ $3p ^{4}P^{\circ}-4d ^{4}D$ $3p ^{4}P^{\circ}-4d ^{2}D$ $3p ^{4}S^{\circ}-5d ^{2}D$ $3p ^{4}P^{\circ}-4d ^{2}D$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
5626,93 5624,06 5607,66 5591,734 5587,888	$\begin{array}{c} 12 \\ 20 \\ 0,5 \\ 1 \\ 1 \end{array}$	14,40 14,40 14,40 14,39 14,39	16,60 16,60 16,61 16,60 16,60	3p 4P°-4d 2P 3p 4P°-4d 4P 3p 4P°-4d 4F 3p 4P°-4d 4P 3p 4P°-4d 4F	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
5577,33 5570,216 5553,53 5552,43 5546,74	$ \begin{array}{c} 10 \\ 2,5 \\ 0,7 \\ 12 \\ 0,7 \end{array} $	14,39 14,40 14,37 14,37 14,68	16,61 16,62 16,60 16,60 16,92	3p 4P°—4d 4P 3p 4P°—4d 2P 3p 4P°—4d 4P 3p 4P°—4d 4F 3p 4S°—5d 4P	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
5540,52 5539,33 5538,61 5534,862 5450,05	$ \begin{array}{c} 18 \\ 6 \\ 0,5 \\ \hline 2 \\ 1 \end{array} $	14,39 14,37 14,68 14,39 14,58 14,58	16,62 16,61 16,92 16,62 16,82 16,86	$3p ^4P^{\circ} - 4d ^2F$ $3p ^4P^{\circ} - 4d ^4P$ $3p ^2S^{\circ} - 5d ^4F$ $3p ^4P - 4d ^2P$ $3p ^2D^{\circ} - 6s ^4P$ $3p ^2D^{\circ} - 6s ^2P$	3/2 - 5/2 $5/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$ $5/2 - 3/2$ $5/2 - 3/2$
5412,900 5410,15 5397,718 5385,88 5381,03	0,6 4 1 $0,6$ $0,8$	14,58 14,58 14,53 14,61 14,61	16,87 16,87 16,82 16,91 16,92	$3p \ ^{2}D^{\circ}-5d \ ^{2}D$ $3p \ ^{2}D^{\circ}-5d \ ^{2}F$ $3p \ ^{4}D^{\circ}-6s \ ^{4}P$ $3p \ ^{2}D^{\circ}-5d \ ^{4}F$ $3p \ ^{2}D^{\circ}-5d \ ^{4}P$	5/2 - 5/2 $ 5/2 - 7/2 $ $ 5/2 - 3/2 $ $ 3/2 - 5/2 $ $ 3/2 - 5/2$
5370,10 5342,80 5316,98 5315,97 5285,57	$\begin{array}{c} 5 \\ 1 \\ 0,5 \\ 3 \\ 0,8 \end{array}$	14,50 14,61 14,53 14,58 14,58	16,81 16,93 16,86 16,91 16,87	$3p ^4D^{\circ} - 6s ^4P$ $3p ^2D^{\circ} - 5d ^2F$ $3p ^4D^{\circ} - 6s ^2P$ $3p ^2D^{\circ} - 5d ^4F$ $3p ^4D^{\circ} - 5d ^4D$	7/2 - 5/2 $3/2 - 5/2$ $5/2 - 3/2$ $5/2 - 7/2$ $5/2 - 5/2$
5279,01 5244,28 5238,69 5230,41 5226,96	$ \begin{array}{c} 12 \\ 0,8 \\ 2 \\ 15 \\ 3 \end{array} $	14,53 14,55 14,50 14,50 14,54	16,87 16,92 16,87 16,87 16,91	$3p ^4D^{\circ} - 5d ^2F$ $3p ^4D^{\circ} - 5d ^4F$ $3p ^4D^{\circ} - 5d ^4D$ $3p ^4D^{\circ} - 5d ^4F$ $3p ^4D^{\circ} - 5d ^4F$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 7/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
5221,42 5207,96 5189,27 5186,41 5110,269	0,5 1 4 0,8 1	14,54 14,55 14,53 14,54 14,39	16,92 16,93 16,91 16,93 16,81	$3p ^4D^{\circ} - 5d ^4F$ $3p ^4D^{\circ} - 5d ^2P$ $3p ^4D^{\circ} - 5d ^4F$ $3p ^4D^{\circ} - 5d ^2F$ $3p ^4P^{\circ} - 6s ^4P$	3/2 $3/2$ $1/2$ $3/2$ $5/2$ $7/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $5/2$
5078,352 5040,69 4989,31 4986,43 4981,54	$0,6\\2\\2,5\\1,5$	14,37 $14,58$ $14,39$ $14,39$ $14,61$ $14,39$	16,81 17,04 16,87 16,87 17,10 16,87	$3p ^4P^{\circ} - 6s ^4P$ $3p ^2D^{\circ} - 6d ^2F$ $3p ^4P^{\circ} - 5d ^4D$ $3p ^4P^{\circ} - 5d ^4D$ $3p ^2D^{\circ} - 6d ^2F$ $3p ^4P^{\circ} - 5d ^4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
4980,45 4960,65	0,8	14,39 14,39 14,37	16,87 16,87	$3p ^{4}P^{\circ} - 5d ^{2}D$ $3p ^{4}P^{\circ} - 5d ^{4}D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{7}{2}$

					
λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	,I
4958, 85	3	14,37	16,87	3p ⁴ P°-5d ⁴ D	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array}$
4956, 01	1	14,37	16,87	3p ⁴ P°-5d ⁴ D	
4955, 41	1,5	14,37	16,87	3p ⁴ P°-5d ² D	
4952 ,20 4950 ,16 4930 ,45 4928 ,83 4926 ,67	2,5 1 1 2 0,8	14,50 14,37 14,40 14,40 14,53	17,00 16,87 16,91 16,91 17,04	$\begin{array}{c} 3p \ ^4D^{\circ} - 7s \ ^4P \\ 3p \ ^4P^{\circ} - 5d \ ^2D \\ 3p \ ^4P^{\circ} - 5d \ ^2P \\ 3p \ ^4P^{\circ} - 5d \ ^4P \\ 3p \ ^4D^{\circ} - 6d \ ^2F \end{array}$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
4898,06	1	14,39	16,92	$3p ^4P^{\circ} - 5d ^4P$	3/2 - 5/2 $7/2 - 7/2$ $7/2 - 9/2$ $3/2 - 5/2$ $5/2 - 7/2$
4888,37	0,8	14,50	17,04	$3p ^4D^{\circ} - 6d ^4D$	
4884,25	2,5	14,50	17,04	$3p ^4D^{\circ} - 6d ^4F$	
4880,46	0,6	14,54	17,08	$3p ^4D^{\circ} - 6d ^4F$	
4874,02	1,5	14,37	16,91	$3p ^4P^{\circ} - 5d ^4F$	
4868,69 4866,33 4847,13 4703,06 4697,00	$0,5 \\ 2 \\ 0,5 \\ 1 \\ 0,6$	14,37 14,39 14,53 14,37 14,50	16,92 16,93 17,08 17,00 17,14	$3p ^4P^{\circ} - 5d ^4P$ $3p ^4P^{\circ} - 5d ^2F$ $3p ^4D^{\circ} - 6d ^4F$ $3p ^4P^{\circ} - 7s ^4P$ $3p ^4D^{\circ} - 7d ^4F$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \end{array} $
4645,42 4644,43 4564,83 3992,210 3966,14	$\begin{array}{c} 2\\1\\0,6\\2\\1,5\end{array}$	14,37 14,37 14,39 12,98 12,98	17,04 17,04 17,10 16,09 16,11	$3p ^4P^{\circ} - 6d ^4D$ $3p ^4P^{\circ} - 6d ^4D$ $3p ^4P^{\circ} - 6d ^2F$ $3s ^2P - 4p ^4D^{\circ}$ $3s ^2P - 4p ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
3953,799	2	12,98	16,12	$3s^{2}P - 4p^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
3948,563	5	13,02	16,16	$3s^{2}P - 4p^{2}P^{\circ}$	
3934,262	5	12,98	16,13	$3s^{2}P - 4p^{2}D^{\circ}$	
3933,11	3	12,98	16,13	$3s^{2}P - 4p^{2}S^{\circ}$	
3930,689	8	13,02	16,18	$3s^{2}P - 4p^{2}P^{\circ}$	
3898,478	5	12,98	16,16	$3s {}^{2}P - 4p {}^{2}P^{\circ}$	3/2 - 3/2 $3/2 - 1/2$ $5/2 - 5/2$ $5/2 - 3/2$ $3/2 - 5/2$
3712,733	0,8	12,73	16,07	$3s {}^{4}P - 4p {}^{4}P^{\circ}$	
3705,93	1,5	12,70	16,04	$3s {}^{4}P - 4p {}^{4}P^{\circ}$	
3691,859	2	12,70	16,05	$3s {}^{4}P - 4p {}^{4}P^{\circ}$	
3690,018	4	12,73	16,09	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	
3689,40	1	12,75	16,11	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3672,85	2,5	12,75	16,12	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	
3668,174	12	12,70	16,07	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	
3667,757	4	12,73	16,11	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	
3661,793	3	12,75	16,13	$3s {}^{4}P - 4p {}^{2}D^{\circ}$	
3657 ,187	3	12,73	16,12	$3s {}^{4}P - 4p {}^{2}D^{\circ}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $
3652 ,982	1,5	12,70	16,09	$3s {}^{4}P - 4p {}^{4}D^{\circ}$	
3651 ,174	2	12,75	16,14	$3s {}^{4}P - 4p {}^{4}S^{\circ}$	
3630 ,776	1,5	12,75	16,16	$3s {}^{4}P - 4p {}^{2}P^{\circ}$	
3629 ,963	4	12,73	16,14	$3s {}^{4}P - 4p {}^{4}S^{\circ}$	
3620 ,789	1	12,70	16,12	3s ⁴ P-4p ² D°	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
3609 ,808	1,5	12,73	16,16	3s ⁴ P-4p ² P°	
3604 ,401	2	12,70	16,13	3s ⁴ P-4p ² D°	
3594 ,103	6	12,70	16,14	3s ⁴ P-4p ⁴ S°	
3574 ,346	1,5	12,70	16,16	3s ⁴ P-4p ² P°	
977,745 976,505 976,217 973,895 972,401	100 40 100 350 20	0,05 0,00 0,05 0,00 0,00	12,73 12,70 12,75 12,73 12,75	$2p^{5} \ ^{2}P^{\circ} - 3s \ ^{4}P$	$^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$
958,524 955,545 954,825 951,871 809,599	500 750 1000 500 125	0,05 0,05 0,00 0,00 0,05	12,98 13,02 12,98 13,02 15,36	$2p^{5} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{2}D$	$^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$

					
λ, λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
806 ,964 796 ,982 795 ,774 794 ,417 792 ,536	150 3 2 10 10	0,00 0,05 0,05 0,05 { 0,05 0,00 0,05	15,36 15,61 15,63 15,66 15,61 15,69	$2p^{5} {}^{2}P^{\circ} - 3s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$	3/2 - 5/2 $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$ $1/2 - 1/2$
791,875 790,006 782,976 782,575 782,378	12 7 5 2 10	0,00 0,00 0,05 0,05 0,05	15,66 15,69 15,88 15,89 15,90	$2p^{5} \ ^{2}P^{\circ}$ — $4s \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ}$ — $4s \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}D$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}D$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
781,654 780,713 780,519 780,390 779,972	3 5 10 15 2	0,05 0,00 0,05 0,05 0,00 0,05	15,91 15,88 15,93 15,93 15,87 15,94	$2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
779,910 779,365 779,192 778,059 777,531	5 6 2 6 4	$0,00\\0,05\\0,00\\0,00\\0,00\\0,00$	15,90 15,96 15,91 15,93 15,93 15,94	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
777,010 776,926 755,603 754,148 753,303	5 4 2 2 4	0,00 0,00 0,05 0,00 0,05 0,00	15,96 15,96 16,46 16,44 16,49 16,46	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}F$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
752 ,884 751 ,861 750 ,610 748 ,946 748 ,709	4 4 3 3 2	0,05 0,00 0,00 0,05 0,05	16,52 16,49 16,52 16,60 16,61	$2p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{4}F$	1/2 - 1/2 $3/2 - 3/2$ $3/2 - 1/2$ $1/2 - 3/2$ $1/2 - 3/2$
748,580 748,338 747,999 746,627 745,767	4 2 2 3 2	0,00 0,00 0,05 0,00 0,00	16,56 16,57 16,62 16,60 16,61	$2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}F$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}F$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
736,987 682,581 680,709	2 2 2	0,00 0,05 0,00	16,82 18,21 18,21	$2p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $

F II, ground state $1s^2 2s^2 2p^{4\,3}P_2$ Ionization potential 282190,2 cm⁻¹; 34,985 eV

λ, Å	I	$E_{ m H}$. eV	E _B , eV	Transition	J
5589,31 5173,16 5001,98 4933,25 4859,37	0 2 3 5 7	33,02 29,71 30,53 30,53 26,66	35,24 32,10 33,01 33,05 29,21	$3p" ^{1}S - 3d" ^{1}P^{\circ}$ $2p^{5} ^{1}P^{\circ} - 3p" ^{1}D$ $3p' ^{1}D - 3d' ^{1}D^{\circ}$ $3p' ^{1}D - 3d' ^{1}F^{\circ}$ $3s' ^{1}D^{\circ} - 3p' ^{1}P$	0-1 1-2 2-2 2-3 2-1
4738,0 4734,37	$_{2}^{0}$	$26,66 \\ 30,53$	29,28 33,15	$3s' {}^{1}D^{\circ} - 3p' {}^{3}D 3p' {}^{1}D - 3d' {}^{1}P^{\circ}$	2—1 2—1

λ, Λ	I	$E_{ m H}$ eV	E _B , eV	Transition	J
4576 ,1 4447 ,18 4446 ,71	0 12 10	25 ,75 28 ,77 28 ,77	28 ,46 31 ,56 31 ,56	$3p \ ^3P - 3s'' \ ^3P^{\circ} \ 3d \ ^3D^{\circ} - 4f \ ^3F \ 3d \ ^3D^{\circ} - 4f \ ^3F$	2-2 3-4, 3, 2 2-3, 2
4446,51	6	28,77	31,56	$3d$ $^3D^{\circ}$ —4 f 3F	1—2
4417,3 4299,177 4278,89 4277,51	3 10 4 6	26,66	29,55 —	3s' 1D°—3p' 1F —	2—3 —
4275,21	8		 94 50	$3d$ $^5D^{\circ}$ $-4f$ 5F	_
4246,16 $4225,12$	15 4	28,66 —	31,58 —	-	<u>_</u>
420 7 ,87 4207 ,442	2 5	28,46 $28,46$	31 ,41 31 ,41	3s" ³ P°—3p" ³ S 3s" ³ P°—3p" ³ S	0—1 1—1
4207,162 4192,62 4126,96 4119,219 4118,756	7 2 2 7 3	28,46 32,10 30,53 26,27 26,27	31,41 35,06 33,54 29,28 29,28	$3s'' ^3P^{\circ} - 3p'' ^3S$ $3p'' ^1D - 3d'' ^1D^{\circ}$ $3p' ^1D - 4s' ^1D^{\circ}$ $3s' ^3D - 3p' ^3D^{\circ}$ $3s' ^3D - 3p' ^3D^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-2 \\ 1-1 \\ 1-2 \end{array} $
4117,008 4116,547	5 7	$26,27 \\ 26,27$	29,28 29,28	$\frac{3s'}{3}D - \frac{3p'}{3}D^{\circ}$ $\frac{3s'}{3}D - \frac{3p'}{3}D^{\circ}$	$\frac{2-1}{2-2}$
975, 4112	5	26,27	29,28	$3s' ^3D - 3p' ^3D^{\circ}$	3-2
4112,734 4109,173	4 8	$26,27 \\ 26,27$	$29,28 \\ 29,28$	$3s' \ ^{3}D - 3p' \ ^{3}D^{\circ}$ $3s' \ ^{3}D - 3p' \ ^{3}D^{\circ}$	$ \begin{array}{c} 2 - 3 \\ 3 - 3 \end{array} $
4103,871	7 7	$\frac{25}{25}, 75$	28, 7 7	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2
4103,724 4103,525	15	25,75 $25,75$	28,77 28,77	$3p^{3}P - 3d^{3}D^{\circ}$	$\begin{array}{c} 0 - 1 \\ 2 - 3 \end{array}$
4103,217 4103,085	5 10	$25,75 \ 25,75$	28 , 7 7 28 , 7 7	$\frac{3p}{3p} \frac{^3P - 3d}{^3D} \frac{^3D^{\circ}}{^3D}$	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
4083,919 4025,495	6	32,10	35,14	$3p'' ^1D - 3d'' ^1F^{\circ}$	2-3
4025,010	15 10	22,67 $22,67$	25,75 25,75	$3s \ ^{3}S^{\circ} - 3p \ ^{3}P$ $3s \ ^{3}S^{\circ} - 3p \ ^{3}P$	$1 - 1 \\ 1 - 0$
4024 ,727 3974 ,791	$\frac{20}{6}$	22,67 $28,46$	25 ,75 31 ,58	3s 3S°—3p 3P 3s" 3P°—3p" 3D	$\begin{array}{c} 1-2 \\ 2-3 \end{array}$
3972,670	4	28,46	31,58	$3s'' ^3P^3 - 3p'' ^3D$	1-2
3972,411 3972,047	$\frac{2}{6}$	28,46 $28,46$	31,58 31,58	$\frac{3s'' ^3P^{\circ} - 3p'' ^3D}{3s'' ^3P^{\circ} - 3p'' ^3D}$	$\begin{array}{c} 2-2 \\ 0-1 \end{array}$
$3971,626 \ 3952,26$	$\frac{3}{2}$	$28,46 \\ 32,10$	31 ,58 35 ,24	$\frac{3s'' ^3P^{\circ} - 3p'' ^3D}{3p'' ^1D - 3d'' ^1P^{\circ}}$	1—1 2—1
3945,65	4	29,78	32,92	$3p' ^3P - 3d' ^3D^{\circ}$	U—1
3944 ,33 3941 ,52	$\frac{6}{3}$	29,77 $29,77$	32,92 32,92	$\frac{3p'}{3p}\frac{3P-3d'}{3D^{\circ}}\frac{3D^{\circ}}{3D^{\circ}}$	1-2 $1-1$
3939,03 3935,00	$\frac{7}{3}$	$29,77 \\ 29,77$	$\frac{32,91}{32,92}$	$3p' \ ^{3}P - 3d' \ ^{3}D^{\circ} \ 3p' \ ^{3}P - 3d' \ ^{3}D^{\circ}$	$\frac{2}{1-2}$
3903,819	4	26,27	29,45	$3s' \ ^3D^c - 3p' \ ^3F$	1-2
3901 ,955 3901 ,852	$\frac{5}{2}$	$\frac{26}{26}$, $\frac{27}{26}$	29 ,45 29 ,45	$3s' \ ^{3}D^{\circ} - 3p' \ ^{3}F$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}F$	2-3
3898,833 3898, 72 5	$\frac{1}{6}$	26,27	29,45	$3s' ^3D^{\circ} - 3p' ^3F$	2—2 3—4
3896,66	3	26,27 31,90	20,45	$3s' \ ^3D^{\circ} - 3p' \ ^3F$	3—3
3896,12	1	31,90	35,08 $35,08$	3p" 3P-3d" 3P 3p" 3P-3d" 3P°	$\begin{array}{c} 2-2 \\ 1-1 \end{array}$
3893 ,04 3851 ,667	$\frac{2}{10}$	31,90 21,90	35 ,08 25 ,12	3p" 3P—3d" 3P° 3s 5S°—3p 5P	1—2 2—1
3849 ,987 3847 ,08 6	15 20	21,90	25,12	$3s {}^{5}S^{\circ} - 3p {}^{5}P$	2—2
3837,68	0,5	21,90 28,46	25 ,12 31 ,69	$\frac{3s}{3s''}\frac{5S^{\circ}-3p}{3p''}\frac{5P}{1P}$	2—3 0—1
3827,68 3818,52	$^{0,5}_2$	29 , 77 29 , 7 8	33 ,01 33 ,02	$\frac{3p'}{3p} \frac{^{3}P - 3d'}{^{3}P - 3d'} \frac{^{1}D^{\circ}}{^{3}S^{\circ}}$	$\begin{array}{c} 1-2 \\ 0-1 \end{array}$
3814,65 182	4	29 ,77	33,02	$3p'$ $3P-3d'$ $3S^{\circ}$	11
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λ, Ä	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
3805,90	5	29 ,77	33,02	3p' 3P-3d' 3S°	2—1
3801,09	3	29 ,77	33,03	3p' 3P-3d' 3P°	1—2
3798,46	3	29 ,78	33,04	3p' 3P-3d' 3P°	0—1
3794,60	2	29 ,77	33,04	3p' 3P-3d' 3P°	1—1
3792,40	4	29,77	33,03	$3p' \ ^3P - 3d' \ ^3P^{\circ}$	2-2
3792,42	1	29,77	33,04	$3p' \ ^3P - 3d' \ ^3P^{\circ}$	1-0
3785,97	3	29,77	33,04	$3p' \ ^3P - 3d' \ ^3P^{\circ}$	2-1
3781,63	2	26,27	29,55	$3s' \ ^3D^{\circ} - 3p' \ ^1F$	2-3
3753,3	0	29,55	32,85	$3p' \ ^1F - 3d' \ ^3F^{\circ}$	3-3
3752,36	2	29,55	32,85	$3p' \ ^1F - 3d' \ ^3F^{\circ}$	3-4
3739,60	4	29,71	33,02	$2p^{5} ^{1}P^{\circ} - 3p'' ^{1}S$	1—0
3710,365	4	29,55	32,89	$3p' ^{1}F - 3d' ^{3}G^{\circ}$	3—4
3706,63	0,5	31,89	35,24	$3p'' ^{3}P - 3d'' ^{1}P^{\circ}$	0—1
3704,51	8	29,55	32,89	$3p' ^{1}F - 3d' ^{1}G^{\circ}$	3—4
3679,67	5	31,69	35,06	$3p'' ^{1}P - 3d'' ^{1}D^{\circ}$	1—2
3668 ,9	0	29,77	33,45	$3p'\ ^{3}P - 3d'\ ^{1}P^{\circ}$	$ \begin{array}{c} 1-1 \\ 1-2 \\ 3, 2-2 \\ 3-3 \\ 3-4 \end{array} $
3656 ,50	0,5	31,69	35,08	$3p''\ ^{1}P - 3d''\ ^{3}P^{\circ}$	
3642 ,798	7	29,45	32,85	$3p'\ ^{3}F - 3d'\ ^{3}F^{\circ}$	
3641 ,985	8	29,45	32,85	$3p'\ ^{3}F - 3d'\ ^{3}F^{\circ}$	
3641 ,011	3	29,45	32,85	$3p'\ ^{3}F - 3d'\ ^{3}F^{\circ}$	
3640 ,891	9	29,45	32,85	3p' 3F-3d' 3F°	$ \begin{array}{c} 4-4 \\ 1-0 \\ 0-1 \\ 2, 1-1 \\ 2, 1-2 \end{array} $
3608 ,89	3	28,46	31,89	3s" 3P°-3p" 3P	
3607 ,32	3	28,46	31,90	3s" 3P°-3p" 3P	
3606 ,80	4	28,46	31,90	3s" 3P°-3p" 3P	
3603 ,72	6	28,46	31,90	3s" 3P°-3p" 3P	
3602,85	8	29,45	32,89	3p' 3F-3d' 3G°	4—5
3601,403	7	29,45	32,89	3p' 3F-3d' 3G°	3—4
3598,704	7	29,45	32,89	3p' 3F-3d' 3G°	2—3
3595,917	5	29,45	32,89	3p' 3F-3d' 1G°	3—4
3590,63	7	31,58	35,03	3p" 3D-3d" 3F°	3—4
3589 ,345 3587 ,980 3587 ,42 3587 ,13 3577 ,23	6 5 3 3 2	31,58 31,58 31,58 31,58 31,58 29,55	35,03 35,03 35,03 35,03 35,03	$3p'' \ ^3D - 3d'' \ ^3F^\circ$ $3p'' \ ^1F - 3d' \ ^1D^\circ$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 3 - 3 \\ 2 - 2 \\ 3 - 2 \end{array} $
3574,92 3571,68 3569,47 3563,87 3548,5	$\begin{array}{c} 3 \\ 3 \\ 2 \\ 0 \\ 0, 5 \end{array}$	29,45 29,45 29,45 31,58 31,58	32,91 32,92 32,92 35,06 35,07	$3p' {}^{1}F - 3d' {}^{1}D^{\circ}$ $3p' {}^{1}F - 3d' {}^{1}D^{\circ}$ $3p' {}^{1}F - 3d' {}^{1}D^{\circ}$ $3p'' {}^{3}D - 3d'' {}^{1}D^{\circ}$ $3p'' {}^{3}D - 3d'' {}^{3}P^{\circ}$	$\begin{array}{c} 4, \ 3, \ 2-3 \\ 3, \ 2-2 \\ 2-1 \\ 1-2 \\ 1-0 \end{array}$
3546,6 3546,06 3545,5 3544,392 3541,937	$0, 1 \\ 0, 5 \\ 3 \\ 8$	31,58 31,58 31,58 26,27 29,55	35,07 35,08 35,07 29,77 33,05	3p" 3D-3d" 3P° 3p" 3D-3d" 3P° 3p" 3D-3d" 3P° 3s' 3D°-3p' 3P 3p' 1F-3d' 1F°	$ \begin{array}{r} 4-1 \\ 1-2 \\ 2-1 \\ 2-2 \\ 3-3 \end{array} $
3541 ,765	9	26,77	29,77	$3s' \ ^3D^{\circ} - 3p' \ ^3P$	$ \begin{array}{r} 3-2 \\ 3-2 \\ 1-1 \\ 2-1 \\ 1-0 \end{array} $
3539 ,45	1	31,58	35,08	$3p'' \ ^3D - 3d'' \ ^3P^{\circ}$	
3538 ,474	3	26,27	29,77	$3s' \ ^3D^{\circ} - 3p' \ ^3P$	
3536 ,838	7	26,27	29,77	$3s' \ ^3D^{\circ} - 3p' \ ^3P$	
3535 ,162	4	26,27	29,78	$3s' \ ^3D^{\circ} - 3p' \ ^3P$	
3522,883 3505,763 3505,614 3505,508 3503,095	6 4 15 6 12	28,17 	31,69 	$3s'' ^{1}P^{\circ} - 3p'' ^{1}P$ $ 3p ^{5}P - 3d ^{5}D^{\circ}$ $3p ^{5}P - 3d ^{5}D^{\circ}$ $3p ^{5}P - 3d ^{5}D^{\circ}$	1—1 — 3—4 3—3 2—3
3502,954	8	25,12	28,66	3p ⁵ P-3d ⁵ D°	$ \begin{array}{c} 2-2 \\ 2-1 \\ 1-2 \end{array} $
3502,859	4	25,12	28,66	3p ⁵ P-3d ⁵ D°	
3501,562	5	25,12	28,66	3p ⁵ P-3d ⁵ D°	

λ, Å	I	$E_{ m H}^{},{ m eV}$	E _B , eV	Transition	J
3501,487	3	25,12	28,66	3p ⁵ P — 3d ⁵ D°	1—1
3501,416	10	25,12	28,66	3p ⁵ P — 3d ⁵ D°	1—0
3493,215	5	31,69	35,24	3p" ¹ P—3d" ¹ P°	1—1
3476,2	0	29,28	32,85	3p' ³ D—3d' ³ F°	3—2
3475,68	2	29,28	32,85	3p' ³ D—3d' ³ F°	3—3
3474,800	7	29,28	32,85	3p' ³ D—3d' ³ F°	3—4
3473,621	2	29,28	32,85	3p' ³ D—3d' ³ F°	2—2
3473,314 3472,964 3453,8 3442,5 34,6,57	5 6 0 0 4	29,28 29,28 29,45 29,45 —	32,85 32,85 33,04 33,05	$3p'\ ^3D - 3d'\ ^3F^\circ$ $3p'\ ^3D - 3d'\ ^3F^\circ$ $3p'\ ^3F - 3d'\ ^3P^\circ$ $3p'\ ^3F - 3d'\ ^1F^\circ$ -	1-2 2-3 3-2 3-3 -
3433,69 3417,21	$\frac{2}{4}$	29,28	32,89	3p' 3D—3d' 1G°	3—4
3417,02	6	25,75	29,38	3p 3P—4s 3S°	2—1
3416,80	1	25,75	29,38	3p 3P—4s 3S°	0—1
3416,58	4	—	—	—	—
3416,45	4	25,75	29,38	$3p ^3P - 4s ^3S^{\circ}$	1-1
3414,663	5	29,28	32,91	$3p' ^3D - 3d' ^3D^{\circ}$	3-3
3412,04	2	29,28	32,91	$3p' ^3D - 3d' ^3D^{\circ}$	2-3
3411,66	3	29,28	32,92	$3p' ^3D - 3d' ^3D^{\circ}$	3-2
3410,82	1,5	29,21	32,85	$3p' ^1P - 3d' ^3F^{\circ}$	1-2
3409,02 3408,68 3406,83 3406,56 3405,980	3 1,5 1 2 4	29,28 29,28 29,28 29,28	32,92 32,92 32,92 32,92 —	$3p'\ ^3D - 3d'\ ^3D^{\circ} \ 3p'\ ^3D - 3d'\ ^3D^{\circ} \ 3p'\ ^3D - 3d'\ ^3D^{\circ} \ - 3p'\ ^3D - 3d'\ ^3D^{\circ} \ -$	$egin{array}{c} 2-2 \\ 1-2 \\ 2-1 \\ 1-1 \\ - \end{array}$
3399,29	3	31,90	35,54	3p" 3P—4s" 3P°	$ \begin{array}{r} 2-2 \\ 2-1 \\ 1-2 \\ 1-0 \\ 0-1 \end{array} $
3398,78	1	31,90	35,55	3p" 3P—4s" 3P°	
3396,63	1	31,90	35,54	3p" 3P—4s" 3P°	
3395,77	1	31,90	35,55	3p" 3P—4s" 3P°	
3394,22	2	31,90	35,54	3p" 3P—4s" 3P°	
3393 ,40	1	31,41	35,06	$3p'' \ ^3S - 3d'' \ ^1D^{\circ}$	1-2 $1-0$ $1-1$ $1-2$ $1-2$
3379 ,29	2	31,41	35,07	$3p'' \ ^3S - 3d'' \ ^3P^{\circ}$	
3377 ,44	4	31,41	35,07	$3p'' \ ^3S - 3d'' \ ^3P^{\circ}$	
3373 ,49	5	31,41	35,08	$3p'' \ ^3S - 3d'' \ ^3P^{\circ}$	
3348 ,43	0,5	29,21	32,92	$3p'' \ ^1P - 3d' \ ^3D^{\circ}$	
3346,41	0,5	29,21	32,92	$3p' ^{1}P - 3d' ^{3}D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 2 \\ 1 - 2 \\ 2 - 1 \\ 3 - 2 \end{array} $
3324,13	0,5	29,28	33,01	$3p' ^{3}D - 3d' ^{1}D^{\circ}$	
3321,30	2	29,28	33,01	$3p' ^{3}D - 3d' ^{1}D^{\circ}$	
3311,63	1	29,28	33,02	$3p' ^{3}D - 3d' ^{3}S^{\circ}$	
3303,89	6	29,28	33,03	$3p' ^{3}D - 3d' ^{3}P^{\circ}$	
3301,41	3	29,28	33,03	$3p'\ ^3D - 3d'\ ^3P^\circ$	2-2
3296,56	5	29,28	33,04	$3p'\ ^3D - 3d'\ ^3P^\circ$	2-1
3296,19	2	29,28	33,04	$3p'\ ^3D - 3d'\ ^3P^\circ$	1-1
3294,37	4	29,28	33,04	$3p'\ ^3D - 3d'\ ^3P^\circ$	1-0
3264,16	7	29,21	33,01	$3p'\ ^1P - 3d'\ ^1D^\circ$	1-2
3239,91	0,5	29 ,21	33,04	$3p' ^{1}P - 3d' ^{3}P^{\circ}$	1-1
3238,10	0	29 ,21	33,04	$3p' ^{1}P - 3d' ^{3}P^{\circ}$	1-0
3215,10	0,5	31 ,69	35,54	$3p'' ^{1}P - 4s'' ^{3}P^{\circ}$	1-2
3214,67	0,5	31 ,69	35,55	$3p'' ^{1}P - 4s'' ^{3}P^{\circ}$	1-1
3202,740	10	26 ,66	30,53	$3s' ^{1}D^{\circ} - 3p' ^{1}D$	2-2
3201 ,17	1	29 ,28	33,45	$3p'\ ^3D - 3d'\ ^1P^\circ$	1-1
3162 ,42	1	26 ,66	30,58	$3s'\ ^1D^\circ - 4p\ ^4P$	2-2
3153 ,492	6	28 ,17	32,40	$3s''\ ^1P^\circ - 3p''\ ^1D$	1-2
3147 ,965	5	29 ,21	33,45	$3p'\ ^1P - 3d'\ ^1P^\circ$	1-1
3125 ,73	1	31 ,58	35,55	$3p''\ ^3D - 4s''\ ^3P^\circ$	1-1, 0

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3125,59	0,5	31 ,58	35,54	3p" 3D—4s" 3P°	2-2
3125,15	1	31 ,58	35,55	3p" 3D—4s" 3P°	2-1
3124,19	2	31 ,58	35,54	3p" 3D—4s" 3P°	3-2
3120,12	1	29 ,45	33,42	3p' 3F—4s' 3D°	4-3
3118,69	0,5	29 ,45	33,42	3p' 3F—4s' 3D°	3-2
3117,75	0	29,45	33,42	$3p' \ ^3F - 4s' \ ^3D^{\circ}$	2-1
3106,16	4	29,55	33,54	$3p' \ ^1F - 4s' \ ^1D^{\circ}$	3-2
3059,960	8	25,12	29,17	$3p \ ^5P - 4s \ ^5S^{\circ}$	3-2
3058,141	7	25,12	29,17	$3p \ ^5P - 4s \ ^5S^{\circ}$	2-2
3057,083	6	25,12	29,17	$3p \ ^5P - 4s \ ^5S^{\circ}$	1-2
2988,45 2904,61 2876,49 2875,88 2874,80	3 0 3 2 4	28,66 26,27 26,27 26,27 26,27	32,81 30,53 30,58 30,58 30,58	$3d ^5D^{\circ} - 5f ^5F$ $3s' ^3D^{\circ} - 3p' ^1D$ $3s' ^3D^{\circ} - 4p ^3P$ $3s' ^3D^{\circ} - 4p ^3P$ $3s' ^3D^{\circ} - 4p ^3P$	3-2 1-0 1-1 2-1
2874,22	1	26,27	30,58	$3s' \ ^{3}D^{\circ} - 4p \ ^{3}P$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 3-2 \\ 1-2 \\ 2-2 \end{array} $
2873,13	2	26,27	30,58	$3s' \ ^{3}D^{\circ} - 4p \ ^{3}P$	
2871,40	5	26,27	30,58	$3s' \ ^{3}D^{\circ} - 4p \ ^{3}P$	
2867,30	3	29,21	33,54	$3p' \ ^{1}P - 4s' \ ^{1}D^{\circ}$	
2739,63	0	30,53	35,06	$3p' \ ^{1}D - 3d'' \ ^{1}D^{\circ}$	
2692,790	5	30,53	35,14	$3p' ^{1}D - 3d'' ^{1}F^{\circ}$	2-3
2556,10	4	28,17	33,02	$3s'' ^{1}P^{\circ} - 3p'' ^{1}S$	1-0
2522,5	0	26,66	31,58	$3s' ^{1}D^{\circ} - 3p'' ^{3}D$	2-3
2497,72	2	30,58	35,55	$4p ^{3}P - 4s'' ^{3}P^{\circ}$	2-1, 0
2496,79	1	30,58	35,54	$4p ^{3}P - 4s'' ^{3}P^{\circ}$	1-2
2466 ,162	$ \begin{array}{c} 4 \\ 0,5 \\ 1 \\ 2 \\ 0,5 \end{array} $	26,66	31,69	$3s' ^{1}D^{\circ} - 3p'' ^{1}P$	2-1
2334 ,99		26,27	31,58	$3s' ^{3}D^{\circ} - 3p'' ^{3}D$	2-3
2334 ,12		26,27	31,58	$3s' ^{3}D^{\circ} - 3p'' ^{3}D$	2-2
2333 ,78		26,27	31,58	$3s' ^{3}D^{\circ} - 3p'' ^{3}D$	3-3
2329 ,93		20,46	25,75	$2p^{5} ^{3}P^{\circ} - 3p ^{3}P$	2-2
2279,36	3	26,66	32,10	$3s' ^{1}D^{\circ} - 3p'' ^{1}D$	2-2
2217,34	5	29,55	35,14	$3p' ^{1}F - 3d'' ^{1}F^{\circ}$	3-3
1747,40	3	22,67	29,77	$3s ^{3}S^{\circ} - 3p' ^{3}P$	1-2
1745,57	2	22,67	29,77	$3s ^{3}S^{\circ} - 3p' ^{3}P$	1-1
1744,86	1	22,67	29,78	$3s ^{3}S^{\circ} - 3p' ^{3}P$	1-0
1704,90 608,065 607,472 606,925 606,805	0,5 7 6 5 8	25,75 0,04 0,06 0,04 0,00	33,02 20,46 20,47 20,47 20,46	$3p\ ^3P - 3d'\ ^3S^\circ \ 2p^4\ ^3P - 2p^5\ ^3P^\circ \ $	$ \begin{array}{c} 2-1 \\ 1-2 \\ 0-1 \\ 1-1 \\ 2-2 \end{array} $
606,284	6	0,04	20,49	$2p^4 \ ^3P - 2p^5 \ ^3P^\circ \ 2p^4 \ ^3P - 2p^5 \ ^3P^\circ \ 2p^4 \ ^1S - 3s'' \ ^1P^\circ \ 2p^4 \ ^3P - 3s \ ^3S^\circ \ 2p^4 \ ^3P - 3s \ ^3S^\circ \ $	1-0
605,668	7	0,00	20,47		2-1
548,517	2	5,59	28,17		0-1
548,324	3	0,06	22,67		0-1
547,873	4	0,04	22,67		1-1
546,846	6	0,00	22,67	$2p^4$ 3P — $3s$ $^3S^\circ$	2-1
514,945	6	2,59	26,66	$2p^4$ 1D — $3s'$ $^1D^\circ$	2-2
513,649	4	5,59	29,71	$2p^4$ 1S — $2p^5$ $^1P^\circ$	0-1
484,600	8	2,59	28,17	$2p^4$ 1D — $3s''$ $^1P^\circ$	2-1
473,021	3	0,06	26,27	$2p^4$ 3P — $3s'$ $^3D^\circ$	0-1
472 ,710	5	0,04	26,27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2
471 ,990	6	0,00	26,27		2-3
471 ,949	3	—	—		-
457 ,177	6	2,59	29,71		2-1
436 ,563	1	0,06	28,46		0-1
436 ,279	2	0,04	28,46	$2p^4$ 3P — $3s''$ $^3P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
435 ,634	3	0,00	28,46	$2p^4$ 3P — $3s''$ $^3P^\circ$	
431 ,826	2	0,06	28,77	$2p^4$ 3P — $3d$ $^3D^\circ$	

λ, Å	I	E_{H} , eV E_{B} ,	eV Transition	J
431,545 430,909	3 4	0,04 28,77 0,00 28,77		$\begin{array}{c} 1-2, \ 1 \\ 2-3, \ 2 \end{array}$
422,012 417,874 407,511 407,053 405,644	1 1 4 5 4	0,00 29,38 5,59 35,24 2,59 33,01 2,59 33,05 2,59 33,15	$2p^4 {}^{1}S - 3d'' {}^{1}P^{\circ} \ 2p^4 {}^{1}D - 3d' {}^{1}D^{\circ} \ 2p^4 {}^{1}D - 3d' {}^{1}F^{\circ}$	21 01 22 23 21
400,579 393,676 380,902 376,686 375,928	1 1 2 1	$\begin{array}{ccc} 2,59 & 33,54 \\ 0,00 & 31,49 \\ 2,59 & 35,14 \\ 0,00 & 32,94 \\ \{ \begin{array}{ccc} 0,04 & 33,02 \\ 0,06 & 33,04 \end{array} \end{array}$	$2p^4 ^3P - 4d ^3D^\circ \ 4 \qquad 2p^4 ^1D - 3d'' ^1F^\circ \ 2p^4 ^3P - 3d' ^3D^\circ \ 2p^4 ^3P - 3d' ^3P^\circ \ $	2-2 2-3 2-2 2-3 1-0 0-1
375,793 375,718 375,434 375,300 353,421	1 1 1 2 0	0,04 33,03 0,04 33,04 0,00 33,02 0,00 33,03 0,00 35,08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 1-1, 0 \\ 2-1 \\ 2-2 \\ 2-2 \end{array} $

F III, ground state $1s^2 2s^2 2p^{3\,4} S^0_{3/2}$ Ionization potential 505410 cm $^{-1}$; 62,659 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3436 ,57 3426 ,34	4	44,69 44,67	48,29 48,29	3p ² P°—3d ² P 3p ² P°—3d ² P	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
3411,66	2 3 2 1	44,69	48,32	$3p^{-1} - 3d^{-1}P$	3/2 - 1/2
3401,62	2	44,67	48,32	$3p^{-2}P^{\circ}-3d^{-2}P$	$^{1}/_{2}$ — $^{1}/_{2}$
3372,24	1	44,69	48,36	$3p^{-2}P^{\circ}-3d^{-4}D$	$^{3}/_{2}^{-}$ $^{-3}/_{2}^{-}$
3367,65	1	44,69	48,37	$3p ^{2}P^{\circ} - 3d ^{4}D$	$^{3}/_{2}$ — $^{1}/_{2}$
3358,32	4	50,18	53,87	3s''' 4S°-3p''' 4P	$^{3}/_{2}$ — $^{5}/_{2}$
3357,82	1	44,67	48,37	$3p^{2}P^{\circ}-3d^{4}D$	$\frac{1}{2}/2 - \frac{1}{2}/2$
3355,98	3	50,18	53,88	$3s''' 4S^{\circ} - 3p''' 4P$	$\frac{3}{2}$ $\frac{3}{2}$
3354,34	2	50,18	53,88	3s''' 4S°—3p''' 4P	$^{3}/_{2}$ — $^{1}/_{2}$
3267,202	4	_	_	_	_
3264,164	9	_		_	_
3253,43	2,5	<u> </u>		- 200	<u> </u>
3213 ,972 3174 ,725	$\frac{6}{10}$	$\frac{40,28}{40,23}$	44,13 44,13	$3s {}^{2}P - 3p {}^{2}D^{\circ} \\ 3s {}^{2}P - 3p {}^{2}D^{\circ}$	$\frac{3}{2} - \frac{3}{2}$
				-	1/ ₂ —3/ ₂
3174 ,125	12	40,28	44,18	$3s^{2}P - 3p^{2}D^{9}$	$\frac{3}{2}$ — $\frac{5}{2}$
3156,11	0	47,65	51,59	$3p' ^{2}P^{\circ} - 3d' ^{2}D$	$\frac{3}{2}$ $\frac{3}{2}$
3154,387	4	47,67	51,60	$3p' 2P^{\circ} - 3d' 2P$	$\frac{3}{2} - \frac{5}{5} / 2$
3146 ,962 3145 ,536	8 4	$39,33 \\ 39,29$	$43,27 \\ 43,23$	3s ⁴ P — 3p ⁴ D° 3s ⁴ P — 3p ⁴ D°	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
			•		0/2-1/2
777, 3142	3	47,65	51,59	$3p'^{2}P^{\circ}-3d'^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
3134,208	8	39,29	43,25	$3s^{4}P - 3p^{4}D^{\circ}$	$^{3}/_{2}$ — $^{3}/_{2}$
3124,762	8	39,26	43,23	$3s ^4P - 3p ^4D^{\circ}$	$^{1}/_{2}$ — $^{1}/_{2}$
3124,18	$\frac{3}{12}$	20 22	<u> </u>	2.40 2.409	5/ 7/
515, 121	12	39,33	43,30	$3s ^4P - 3p ^4D^{\circ}$	$^{5}/_{2}$ — $^{7}/_{2}$
669, 3115	10	39,29	43,27	$3s ^4P - 3p ^4D^{\circ}$	$^{3}/_{2}$ — $^{5}/_{2}$
579, 5113	8	39,26	43,25	$3s ^4P - 3p ^4D^9$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3066,71	2	44,32	48,36	$3p^{4}S^{\circ} - 3d^{4}D$	$\frac{3}{2}$ $\frac{5}{2}$
3049,139	$\frac{8}{2}$	42,65	46,72	$3s' {}^{2}D - 3p' {}^{2}P^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
3048 ,80 86	2	42,65	46,72	$3s' {}^2D - 3p' {}^2F^{\circ}$	$^{5}/_{2}$ — $^{5}/_{2}$

λ, Ä	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
3047,077 3042,808 3039,746 3039,254 3034,54	4 10 6 7 1,5	42,65 47,15 47,14 47,14		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
30ó3 ,15 3001 ,920 3000 ,097 2999 ,465 2997 ,513	2 3 4 6 6	53,88 53,88 53,87 48,59 48,59	58,01 58,01 58,01 52,72 52,72	$3p''' ^4P - 3a''' ^4D^\circ$ $3p''' ^4P - 3a''' ^4D^\circ$ $3p''' ^4P - 3a''' ^4D^\circ$ $3s''' ^6S^\circ - 3p''' ^6P$ $3s''' ^6S^\circ - 3p''' ^6P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2997,168 2994,273 2988,45 2:84,479 2983,765	6 8 4 5 4	44,32 48,59 — 44,32	48,45 52,73 — 48,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{3/2}_{2}$ $^{5/2}_{2}$ $^{7/2}_{2}$ $^{3/2}$ $^{3/2}$
2978,145 2966,89 2961,596 2959,666 2955,13	4 1 5 2 2	44,32 47,67 47,67 44,32 47,65	48,48 51,84 51,85 48,51 51,84	$3p ^{4}S^{\circ} - 3d ^{4}P$ $3p' ^{2}P^{\circ} - 3d' ^{2}P$ $3p' ^{2}P^{\circ} - 3d' ^{2}P$ $3p ^{4}S^{\circ} - 3d ^{2}P$ $3p' ^{2}P^{\circ} - 3d' ^{2}P$	3/2— $1/2$ $3/2$ — $1/2$ $3/2$ — $3/2$ $3/2$ — $3/2$ $1/2$ — $1/2$
2954,37 2949,91 2932,479 2920,887 2920,538	0,5 1,5 8 4 6	49,00 47,65 39,33 46,20 46,20	53,20 51,85 43,56 50,45 50,45	$3d^{2}D-4p^{2}D^{\circ} \ 3p'^{2}P^{\circ}-3d'^{2}P \ 3s^{4}P-3p^{4}P^{\circ} \ 3s''^{2}S-3p''^{2}P^{\circ} \ 3s''^{2}S-3p''^{2}P^{\circ}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{3}{2} $
2916,335 2913,279 2905,301 2895,458 2889,447	10 8 6 4 8	39,33 39,29 39,29 39,26 39,29	43,58 43,55 43,56 43,55 43,58	3s ⁴ P-3p ⁴ P° 3s ⁴ P-3p ⁴ P° 3s ⁴ P-3p ⁴ P° 3s ⁴ P-3p ⁴ P° 3s ⁴ P-3p ⁴ P°	$\begin{array}{c} {}^{5}/_{2} - {}^{5}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{3}/_{2} - {}^{5}/_{2} \end{array}$
2887,559 2876,49 2875,87 2874,81 2873,12	8 3 5 4	39,26 — — — — —	43,56 — — — — —	3s ⁴ P-3p ⁴ P°	1/ ₂ —3/ ₂ — — — —
2871,40 2869,993 2867,30 2865,670 2862,866	8 3 5 4 6	44 .69 -44 ,18 44 ,67	49,00 48,51 49,00	$\begin{array}{c} - \\ 3p \ ^2P^{\circ} - 3d \ ^2D \\ - \\ 3p \ ^2D^{\circ} - 3d \ ^2F \\ 3p \ ^2P^{\circ} - 3d \ ^2D \end{array}$	$^{3}/_{2}$ $^{-3}/_{2}$ $^{-3}/_{2}$ $^{-5}/_{2}$ $^{-5}/_{2}$ $^{-1}/_{2}$ $^{-3}/_{2}$
2860,308 2841,7 2835,606 2833,962 2826,081	9 3 9 8 5	44,69 44,18 44,13	49,02 — 48,55 48,51 —	$3p ^{2}P^{\circ}$ $-3d ^{2}D$ $-3p ^{2}D^{\circ}$ $-3d ^{2}F$ $3p ^{2}D^{\circ}$ $-3d ^{2}F$ -	$ \begin{array}{r} 3/2 - 5/2 \\ - 5/2 - 7/2 \\ 3/2 - 5/2 - 5/2 \\ - 5/2 - 5/2 \end{array} $
2823 ,77 2820 ,695 2818 ,302 2811 ,422 2803 ,97	3 4 5 10 0,5			$\begin{array}{c} -\\ -\\ 3s {}^{2}P^{\circ}-3p {}^{2}P \\ 3s {}^{2}P^{\circ}-3p {}^{2}P \\ 3d {}^{2}P-4p {}^{2}S^{\circ} \end{array}$	$\begin{array}{c} - \\ - \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array}$
2795,500 2794,2 2793,18 2789,352 2788,093	4 3 2 3 20	49,00 49,02 40,23	 53 ,44 53 ,46 44 ,67	$\begin{array}{c} -\\ -\\ 3d \ ^2D-4p \ ^2P^{\circ} \\ 3d \ ^2D-4p \ ^2P^{\circ} \\ 3s \ ^2P^{\circ}-3p \ ^2P \end{array}$	$ \begin{array}{c} -\\ -\\ 3/2 - 1/2\\ 5/2 - 3/2\\ 1/2 - 1/2 \end{array} $
2787,72 2787,38 2783,30	$\begin{smallmatrix}2\\0,5\\0\end{smallmatrix}$	47 ,15 48 ,29 47 ,14	51,59 52,74 51,59	$3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$ $3d \ ^{2}P - 4p \ ^{2}S^{\circ}$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$	$\frac{3}{2} \frac{3}{2} \frac{3}{2}$ $\frac{3}{2} \frac{1}{2}$ $\frac{5}{2} \frac{3}{2}$

λ, Å	I	$E_{_{ m H}}^{}$, eV	E _B , eV	Transition	J
2781,956 2781,350	4 5	47,14 $40,23$	51,60 44,69	3p' 2D°—3d' 2D 3s 2P°—3p 2P	$^{5/}_{2}$ $^{5/}_{2}$ $^{1/}_{2}$ $^{3/}_{2}$
2759,81 2759,589 2756,664 2755,556 2755,307	5 10 5 7 4	42,65 42,65 46,72 42,65 42,65	47,14 47,14 51,22 47,15 47,15	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$ $3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$ $3p' \ ^{2}F^{\circ} - 3d' \ ^{2}F$ $3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$ $3s' \ ^{3}D - 3p' \ ^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2752 ,8 2751 ,8 2747 ,870 2740 ,31 2739 ,11	1 1 5 1	46,72 46,72 46,72 48,47 48,48	51,23 51,22 51,23 52,99 53,00	$3p' \ ^{2}F^{\circ}$ $-3d' \ ^{2}F$ $3p' \ ^{2}F^{\circ}$ $-3d' \ ^{2}F$ $3p' \ ^{2}F^{\circ}$ $-3d' \ ^{2}F$ $3d \ ^{4}P$ $-4p \ ^{4}P^{\circ}$ $3d \ ^{4}P$ $-4p \ ^{4}P^{\circ}$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2737,954 2733,8 2727,93 2727,47 2723,25	4 0,5 2 0 1	47,67 48,47 47,65 48,36 48,45	52,19 53,00 52,19 52,90 53,00	$3p'\ ^{2}P^{\circ}$ — $3d'\ ^{2}S$ $3d\ ^{4}P^{\circ}$ — $4p\ ^{4}P^{\circ}$ $3p'\ ^{2}P^{\circ}$ — $3d'\ ^{2}S$ $3d\ ^{4}D$ — $4p\ ^{4}D^{\circ}$ $3d\ ^{4}P$ — $4p\ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
2719,89 2718,14 2709,408 2695,45	1,5 1 3 4	48,47 48,38 48,45	53,03 52,94 53,03	3d ⁴ P-4p ⁴ P° 3d ⁴ D-4p ⁴ D° 3d ⁴ P-4p ⁴ P°	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{5}{2} - \frac{5}{2} $
2677,42	0	48,37	52,99	$3d$ 4D — $4p$ 4P $^\circ$	$^{1}/_{2}$ — $^{1}/_{2}$
2674,54 2668,25 2664,390 2656,475 2656,294	1 2 3 6 3	48,36 48,36 48,38 52,73 52,73	52,99 53,00 53,03 57,39 57,39	$3d ^4D - 4p ^4P^{\circ} \ 3d ^4D - 4p ^4P^{\circ} \ 3d ^4D - 4p ^4P^{\circ} \ 3p''' ^6P - 3d''' ^6D^{\circ} \ 3p''' ^6P - 3d''' ^6D^{\circ}$	3/2 - 1/2 $5/2 - 3/2$ $7/2 - 5/2$ $7/2 - 9/2$ $7/2 - 7/2$
2653,757 2653,491 2653,252 2651,958 2651,723	5 4 2 3 3	52,72 52,72 52,72 52,72 52,72	57,39 57,39 57,39 57,39 57,39	$3p''' ^{6}P - 3d''' ^{6}D^{\circ}$ $3p''' ^{6}P - 3d''' ^{6}D^{\circ}$ $3p''' ^{6}P - 3d''' ^{6}D^{\circ}$ $3p''' ^{6}P - 3d''' ^{6}D^{\circ}$ $3p''' ^{6}P - 3d''' ^{6}D^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2651,550 2645,5 2641,24 2639,47 2639,05	3 0 2 3 4	52,72 44,32 48,51 48,55 47,15	57,39 49,00 53,20 53,25 51,84	$3p''' ^6P - 3d''' ^6D^{\circ}$ $3p ^4S^{\circ} - 3d ^2D$ $3d ^2F - 4p ^2D^{\circ}$ $3d ^2F - 4p ^2D^{\circ}$ $3p' ^2D - 3d' ^2P$	3/2 $-1/2$ $3/2$ $-3/2$ $5/2$ $-3/2$ $7/2$ $-5/2$ $3/2$ $-1/2$
2634,8 2630,93 2629,686 2625,000 2617,3	0,5 1 8 7 1	47,15 47,14 46,72 46,72 43,56	51,85 51,85 51,44 51,44 48,29	$3p'\ ^{2}D^{\circ}-3d'\ ^{2}P$ $3p'\ ^{2}D^{\circ}-3d'\ ^{2}P$ $3p'\ ^{2}F^{\circ}-3d'\ ^{2}G$ $3p'\ ^{2}F^{\circ}-3d'\ ^{2}G$ $3p\ ^{4}P^{\circ}-3d\ ^{2}P$	3/2 $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $7/2$ $9/2$ $5/2$ $7/2$ $3/2$ $3/2$ $3/2$
2613,083 2610,8 2606,045 2602,9 2600,551	5 0,5 5 0 4	43,30 43,55 43,27 43,56 43,25	48,04 48,29 48,02 48,32 48,01	$3p ^4D^{\circ} - 3d ^4F$ $3p ^4P^{\circ} - 3d ^2P$ $3p ^4D^{\circ} - 3d ^4F$ $3p ^4P^{\circ} - 3d ^2P$ $3p ^4D^{\circ} - 3d ^4F$	7/2 $-7/2$ $1/2$ $-3/2$ $5/2$ $-5/2$ $3/2$ $-1/2$ $3/2$ $-3/2$
2599 ,230 2596 ,5 2595 ,488 2593 ,195 2592 ,804	8 1 7 6 6	43,30 43,55 43,27 43,25 43,23	48,07 48,32 48,04 48,02 48,01	$3p ^4D^{\circ} - 3d ^4F$ $3p ^4P^{\circ} - 3d ^2P$ $3p ^4D^{\circ} - 3d ^4F$ $3p ^4D^{\circ} - 3d ^4F$ $3p ^4D^{\circ} - 3d ^4F$	7/2 - 9/2 $1/2 - 1/2$ $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 3/2$
2592,65 2592,43 2583,760 2580,031 2579,846	1 1 7 6 3	43,58 43,58 43,58 43,56 43,56	48,36 48,36 48,38 48,36 48,36	3p 4P°—3d 4D 3p 4P°—3d 4D 3p 4P°—3d 4D 3p 4P°—3d 4D 3p 4P°—3d 4D 3p 4P°—3d 4D	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
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λ, Å	I	E _H , eV	$E_{ m B}$, eV	Transition	J
2577,19 2573,596 2570,917 2562,413 2552,29	2 4 4 4 0	43,56 43,55 43,55 44,18 48,01	48,37 48,36 48,37 49,02 52,87	$3p ^4P^{\circ} - 3d ^4D$ $3p ^4P^{\circ} - 3d ^4D$ $3p ^4P^{\circ} - 3d ^4D$ $3p ^2D^{\circ} - 3d ^2D$ $3d ^4F - 4p ^4D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
2550,89 2549,68 2546,23 2544,63 2543,4	1 2 3 4 1	48,02 48,04 48,07 44,13 46,72	52,88 52,90 52,94 49,00 51,60	$3d^{4}F-4p^{4}D^{\circ} \ 3d^{4}F-4p^{4}D^{\circ} \ 3d^{4}F-4p^{4}D^{\circ} \ 3p^{2}D^{\circ}-3d^{2}D \ 3p'^{2}F^{\circ}-3d'^{2}D$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array}$
2542,767 2541,03 2539,58 2533,644 2530,66	$\begin{array}{c} 6 \\ 1 \\ 00 \\ 4 \\ 2 \end{array}$	43,58 46,72 48,02 43,58 43,56	48,45 51,59 52,90 48,47 48,45	$3p ^4P^{\circ} - 3d ^4P$ $3p' ^2F^{\circ} - 3d' ^2D$ $3d ^4F - 4p ^4D^{\circ}$ $3p ^4P^{\circ} - 3d ^4P$ $3p ^4P^{\circ} - 3d ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2521,590 2517,07 2515,62 2511,16 2492,58	4 3 4 1 0	43,56 43,56 43,55 43,55 43,58	48,47 48,48 48,47 48,48 48,55	$3p ext{ }^{4}P^{\circ} - 3d ext{ }^{4}P$ $3p ext{ }^{4}P^{\circ} - 3d ext{ }^{2}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
2484,360 2478,709 2470,48 2470,279 2466,162	9 6 3 7 4	39,33 42,65 42,65 42,65 —	44,32 47,65 47,67 47,67 —	$3s {}^{4}P - 3p {}^{4}S^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}P^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}P^{\circ}$ $3s' {}^{2}D - 3p' {}^{2}P^{\circ}$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2464 ,834 2455 ,81 2452 ,070 2451 ,56 2449 ,5	8 0,5 7 4 5	39,29 43,25 39,29 — 43,30	44,32 48,29 44,32 — 48,36	$\begin{array}{c} 3s^4P - 3p^4S^{\circ} \\ 3p^4D^{\circ} - 3d^2P \\ 3s^4P - 3p^4S^{\circ} \\ - \\ 3p^4D^{\circ} - 3d^4D \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ - \\ 7/2 - 5/2 \end{array} $
2441,622 2434,13 2433,95 2426,280 2422,91	8 6 3 4 3	43,30 43,27 43,27 43,27 43,25	48,38 48,36 48,36 48,38 48,38	3p 4D°—3d 4D 3p 4D°—3d 4D 3p 4D°—3d 4D 3p 4D°—3d 4D 3p 4D°—3d 4D	7/2 - 7/2 $ 5/2 - 5/2 $ $ 5/2 - 3/2 $ $ 5/2 - 7/2 $ $ 3/2 - 5/2$
2422,78 2420,44 2419,36 2416,05 2413,69	4 3 0,5 4 3	43,25 43,25 48,32 43,23 43,23	48,36 48,37 53,44 48,36 48,37	$3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4D$ $3d ^2P - 4p ^2P^{\circ}$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4D$	3/2 - 3/2 $3/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$ $1/2 - 1/2$
2405,01 2397,29 2381,99 2367,2 2298,31	4 1 2 1 3	43,30 48,29 43,27 •43,25	48,45 53,46 48,47 48,48	$3p ^4D^{\circ}$ — $3d ^4P$ $3d ^2P$ — $4p ^2P^{\circ}$ $3p ^4D^{\circ}$ — $3d ^4P$ $3p ^4D^{\circ}$ — $3d ^4P$	$\begin{array}{c} 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
2217,34 2206,94 658,337 656,878 656,125	5 3 12 11 10	42,70 42,70 0,00 0,00 0,00	48,29 48,32 18,83 18,87 18,90	$3p {}^{2}S^{\circ} - 3d {}^{2}P$ $3p {}^{2}S^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$	1/2 - 3/2 $1/2 - 1/2$ $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 1/2$
630,194 630,131 567,794 567,737 567,676	7 6 6 9 10	6,39 6,39 4,23 4,23 4,23	26,06 26,06 26,06 26,06 26,06	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}D$	3/2 $5/2$ $1/2$ $3/2$ $3/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$
567,629 523,661 522,288	6 4 3	4,23 26,06 26,06	26,06 49,74 49,80	$2p^3 \ ^2D^{\circ} - 2p^4 \ ^2D - 2p^5 \ ^2P^{\circ} - 2p^4 \ ^2D - 2p^5 \ ^2P^{\circ} - 2p^4 \ ^2D - 2p^5 \ ^2P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
508,384 465,113	10 10	6,39 6,39	30,78 33,05	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
464,284 430,218 430,154 429,511 396,247	9 8 11 10 1	6,39 4,23 4,23 4,23 18,90	33,09 33,05 33,05 33,09 50,18	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{3}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{3}P$ $2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$	3/2, $1/2$ — $1/2$ $3/2$ — $3/2$ $5/2$ — $3/2$ $3/2$ — $1/2$ $1/2$ — $3/2$
395,968 395,442 378,603 378,563	2 3 2 1	18,87 18,83 26,06 26,06	50,18 50,18 58,81 58,82	$2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ} \ 2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ} \ 2p^{4} {}^{2}D - 3s^{IV} {}^{2}D^{\circ} \ 2p^{4} {}^{2}D - 3s^{IV} {}^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
366,391 365,874 344,388 343,931 343,892 341,924	6 7 6 4 7 7	6,39 6,39 4,23 4,23 4,23 6,39	40,23 40,28 40,23 40,28 40,28 42,65	$2p^{3} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{3}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{3}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{3}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3s' {}^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
322,685 322,650 316,998 316,823 316,488	7 8 2 3 4	4,23 4,23 18,90 18,87 18,83	42,65 42,65 58,01 58,01 58,01	$2p^{3} {}^{2}D^{\circ} - 3s' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3s' {}^{2}D$ $2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$	3/2 - 5/2, 3/2 $5/2 - 5/2, 3/2$ $1/2 - 3/2, 1/2$ $3/2 - 5/2$ $5/2 - 7/2$
315,748 315,539 315,221 311,415 295,886	6 7 8 4 6	0,00 0,00 0,00 6,39 6,39	39,26 39,29 39,33 46,20 48,29	$2p^{3} {}^{4}S^{\circ} - 3s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3s {}^{4}P$ $2p^{3} {}^{2}P^{\circ} - 3s {}^{"}{}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2, 1/2 - 1/2$ $3/2, 1/2 - 3/2$
295,710 295,405 295,365 290,947 290,848	5 1 2 5 6	6,39 6,39 6,39 6,39 6,39	48,32 48,36 48,37 49,00 49,02	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
281,350 281,207 280,905 280,010 279,692	4 3 1 6 7	4,23 4,23 4,23 4,23 4,23	48,29 48,32 48,36 48,51 48,55	$2p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}F$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2, 3/2 - 5/2, 3/2, 1/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array}$
276,895 276,786 274,260 273,207 272,915	4 5 6 2 3	4,23 4,23 6,39 6,39 6,39	49,00 49,02 51,60 51,77 51,82	$2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	$\begin{array}{c} 3/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 3/_2, \ 1/_2 - 5/_2, \ 3/_2 \\ 3/_2, \ 1/_2 - 1/_2 \\ 3/_2, \ 1/_2 - 3/_2 \end{array}$
272,758 272,710 270,675 263,807 261,751	3 4 4 8 6	6,39 6,39 6,39 4,23 4,23	51,84 51,85 52,19 51,23 51,59	$2p^3 \ ^2P^{\circ} - 3d' \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d' \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d' \ ^2S$ $2p^3 \ ^2D^{\circ} - 3d' \ ^2F$ $2p^3 \ ^2D^{\circ} - 3d' \ ^2D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
261,716 260,782 260,498 260,375 260,313	7 1 3 3 4	4,23 4,23 4,23 4,23 4,23	51,60 51,77 51,82 51,84 51,85	$2p^3 \ ^2D^{\circ} - 3d' \ ^2D \ 2p^3 \ ^2D^{\circ} - 4s \ ^2P \ 2p^3 \ ^2D^{\circ} - 4s \ ^2P \ 2p^3 \ ^2D^{\circ} - 3d' \ ^2P \ 2p^3 \ ^2D^{\circ} - 3d' \ ^2P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
256,890 256,673 256,525 256,360 255,865	2 1 1 5 7	6,39 6,39 6,39 0,00 0,00	54,65 54,69 54,72 48,36 48,45	$2p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$	3/2, $1/2$ — $5/2$, $3/2$ $3/2$, $1/2$ — $3/2$ $3/2$, $1/2$ — $1/2$ $3/2$ — $5/2$, $3/2$ $3/2$ — $5/2$

λ, Å	I	$E_{_{ m II}},{ m eV}$	E_{B} , eV	Transition	J
255,772	6	0,00	48 ,47	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$	3/2-3/2
255,725	5	0,00	48,48	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$	$3/2_2_1/2$
255,624	1	6,39	54,89	$2p^{3-2}P^{\circ}-3d''^{-2}D$	3/2, $1/2 - 5/2$, $3/2$
254,193	3	6,39	55,16	$2p^{3} 2P^{\circ} - 4d^{2}D$	$\frac{3}{2}$, $\frac{1}{2}$ $\frac{3}{2}$
254,162	4	6,39	55,17	$2p^3$ $^2P^{\circ}$ —4d 2D	$\frac{3}{2}$ $\frac{5}{2}$
245,860	1	4,23	54,65	$2p^{3} {}^{2}D^{\circ}$ — $4s' {}^{2}D$	$^{5}/_{2}$, $^{3}/_{2}$ — $^{5}/_{2}$, $^{3}/_{2}$
245,002	3	4,23	54,83	$2p^{3} {}^{2}D^{\circ}$ —4d ${}^{2}F$	$^{3}/_{2}$ — $^{5}/_{2}$
244,768	4	4,23	54,88	$2p^{3} 2D^{\circ} - 4d^{2}F$	5/2-7/2
244,698	2	4,23	54,89	$2p^{3} {}^{2}D^{\circ} - 3d'' {}^{2}D$	$\frac{5}{2}$ $\frac{5}{2}$
243,364	1	4,23	55,17	$2p^{3} {}^{2}D^{\circ}$ —4 $d {}^{2}D$	$\frac{5}{2}$, $\frac{3}{2}$, $\frac{5}{2}$, $\frac{3}{2}$
240,730	2	6,39	57,92	$2p^{3} {}^{2}P^{\circ}$ — $4d' {}^{2}D$	$^{3}/_{2}$, $^{1}/_{2}$ — $^{5}/_{2}$, $^{3}/_{2}$
240,550	1	0,00	51,54	$2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$	$\frac{3}{2}$ $\frac{5}{2}$
240,233	1	6,39	58,00	$2p^{3} 2P^{\circ} - 4d'^{2}P$	$3/_2$, $1/_2$ $3/_2$, $1/_2$
231,100	3	4,23	57,87	$2p^{3} 2D^{\circ} - 4d'^{2}F$	$\frac{5}{2}$, $\frac{3}{2}$, $\frac{7}{2}$, $\frac{5}{2}$
231,015	2	4,23	57,92	$2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}D$	$\frac{5}{2}$, $\frac{3}{2}$, $\frac{5}{2}$, $\frac{3}{2}$
230,117	5	0,00	53,88	$2p^{3} {}^{4}S^{\circ} - 3p''' {}^{4}P$	$3/_2$ — $5/_2$, $3/_2$, $1/_2$
226,166	4	0,00	54,82	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	3/2-5/2
226,091	3	0,00	54,84	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	$^{3/2}$ _3/2
226,051	2	0,00	54,84	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	$^{3}/_{2}^{-}$ _{2}^{-}/_{2}^{-}
214,865	1	0,00	57,70	$2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$	$3/2_{2}^{2}$
214,804	1	0,00	57,72	$2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$	3/2 $3/2$, $1/2$

F IV, ground state $1s^2 2s^2 2p^2$ 3P_0 Ionization potential 703020 cm $^{-1}$; 87,157 eV

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λ, .\	I	E _H , eV	E _B , eV	Transition	J
3176,08	2	64,45	68,36	$3s ^{3}P - 3p ^{3}D^{\circ}$	$ \begin{array}{r} 2-3 \\ 1-2 \\ 2-1 \\ 2-2 \\ 1-1 \end{array} $
3167,74	1	64,41	68,32	$3s ^{3}P - 3p ^{3}D^{\circ}$	
2882,99	0	51,72	56,02	$3s ^{3}P^{\circ} - 3p ^{3}D$	
2861,40	2	51,72	56,05	$3s ^{3}P^{\circ} - 3p ^{3}D$	
2841,72	2	51,65	56,02	$3s ^{3}P^{\circ} - 3p ^{3}D$	
2826 ,13	5	51,72	56,10	$3s ^{3}P^{\circ} - 3p ^{3}D$	$ \begin{array}{r} 2 - 3 \\ 0 - 1 \\ 1 - 2 \\ 2 - 1 \\ 3 - 3 \end{array} $
2823 ,80	3	51,63	56,02	$3s ^{3}P^{\circ} - 3p ^{3}D$	
2820 ,74	4	51,65	56,05	$3s ^{3}P^{\circ} - 3p ^{3}D$	
2807 ,46	0	62,36	66,77	$3s ^{5}P - 3p ^{5}D^{\circ}$	
2806 ,00	1	62,40	66,81	$3s ^{5}P - 3p ^{5}D^{\circ}$	
2796,80	$\begin{array}{c} 2 \\ 3 \\ 1 \\ 3 \\ 2 \end{array}$	62,36	66,79	$3s ^5P - 3p ^5D^{\circ}$	2-2
2794,26		58,23	62,66	$3p ^1D - 3d ^1F^{\circ}$	2-3
2788,56		62,33	66,77	$3s ^5P - 3p ^5D^{\circ}$	1-1
2785,96		62,40	66,84	$3s ^5P - 3p ^5D^{\circ}$	3-4
2781,18		62,36	66,81	$3s ^5P - 3p ^5D^{\circ}$	2-3
2778,03	1	62,33	66,79	$3s ^5P - 3p ^5D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-1 \\ 2-2 \\ 0-1 \\ 1-2 \end{array} $
2764,60	0	64,45	68,94	$3s ^3P - 3p ^3P^{\circ}$	
2744,51	1	64,45	68,97	$3s ^3P - 3p ^3P^{\circ}$	
2723,25	0	64,39	68,94	$3s ^3P - 3p ^3P^{\circ}$	
2718,34	0	64,41	68,97	$3s ^3P - 3p ^3P^{\circ}$	
2713,54 2706,66 2695,45 2695,03 2688,11	$egin{array}{c} 0 \\ 1 \\ 3 \\ 1 \\ 2 \end{array}$	57,11 57,11 57,11 57,08 57,08	61,68 61,69 61,71 61,68 61,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $
2682,60	1	57,06	61,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0—1
2648,18	0	66,84	71,52		4—4
2640,63	1	66,81	71,51		3—3

λ, Å	I	$E_{ m H}^{}$, eV	$E_{\mathtt{B}},\ eV$	Transition	J
2635,37 2634,49	3 0	66,84 66,79	71,55 71,49	3p ⁵ D°—3d ⁵ F 3p ⁵ D°—3d ⁵ F	4—5 2—2
2630 ,28 2626 ,74	3 2	66,81 66,79 (66,76	71,52 71,51 71,48	3p ⁵ D°-3d ⁵ F 3p ⁵ D°-3d ⁵ F 3p ⁵ D°-3d ⁵ F	3—4 2—3 0—1
2625,51 2557,93 2555,59	$\begin{array}{c} 0 \\ 2 \\ 00 \end{array}$	66,77 67,31 67,28	71,49 72,15 72,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 3-4 2-1
2554,47 2551,61 2548,45 2548,10 2546,98	1 1 00 0 0	67,28 67,28 67,27 67,27 67,27	72,13 72,14 72,13 72,13 72,13 72,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-0 \\ 1-1 \\ 1-2 \end{array} $
2536,62 2523,67 2516,27 2515,57 2515,01	1 3 00 2 2	62,40 62,40 62,36 62,36 51,72 57,11	67,28 67,31 67,27 67,28 56,64 62,04	$3s {}^{5}P - 3p {}^{5}P^{\circ}$ $3s {}^{3}P^{\circ} - 3p {}^{3}S$ $3p {}^{3}P - 3d {}^{3}P^{\circ}$	3-2 3-3 2-1 2-2 2-1 2-2
2508,31 2503,57 2501,66 2501,10 2498,95	0 1 0 1 0	62,33 62,36 57,11 62,33 57,08	67,27 67,31 62,06 67,28 62,04	3s ⁵ P-3p ⁵ P° 3s ⁵ P-3p ⁵ P° 3p ³ P-3d ³ P° 3s ⁵ P-3p ⁵ P° 3p ³ P-3d ³ P°	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 2 - 1 \\ 1 - 2 \\ 1 - 2 \end{array} $
2485,79 2484,06 2479,77 2478,05 2475,31	0 1 0 1 0	57,08 51,65 56,05 56,10 57,06	62,06 56,64 61,05 61,10 62,06	$3p \ ^3P - 3d \ ^3P^{\circ}$ $3s \ ^3P^{\circ} - 3p \ ^3S$ $3p \ ^3D - 3d \ ^3F^{\circ}$ $3p \ ^3D - 3d \ ^3F^{\circ}$ $3p \ ^3P - 3d \ ^3P^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 2 - 2 \\ 3 - 3 \\ 0 - 1 \end{array} $
2463,79 2456,92 2451,58 2435,62 2311,83	2 5 4 2 3	56,02 56,10 56,05 56,02 51,72	61,05 61,15 61,10 61,10 57,08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 2-3 \\ 1-2 \\ 2-1 \end{array} $
2298,29 2297,82 2294,17 2286,69 2285,22	5 2 2 1 2	51 ,72 56 ,64 51 ,65 56 ,64 51 ,65	57,11 62,04 57,06 62,06 57,08	$3s ^3P^{\circ} - 3p ^3P$ $3p ^3S - 3d ^3P^{\circ}$ $3s ^3P^{\circ} - 3p ^3P$ $3p ^3S - 3d ^3P^{\circ}$ $3s ^3P^{\circ} - 3p ^3P$	2-2 1-2 1-0 1-1 1-1
2280 ,72 2273 ,65 2271 ,97 2211 ,07 2197 ,36	0 2 3 1 0	56,64 51,63 51,65 56,10 56,05	62,08 57,08 57,11 61,71 61,69	3p 3S-3d 3P° 3s 3P°-3p 3P 3s 3P°-3p 3P 3p 3D-3d 3D° 3p 3D-3d 3D°	$ \begin{array}{r} 1 - 0 \\ 0 - 1 \\ 1 - 2 \\ 3 - 3 \\ 2 - 2 \end{array} $
2171,44 679,217 679,003 677,224 677,154	4 16 13 15 13	52,52 0,08 0,08 0,03 0,03	58,23 18,33 18,33 18,33 18,34	$3s ^{1}P^{\circ} - 3p ^{1}D$ $2p^{2} ^{3}P - 2p^{3} ^{3}D^{\circ}$	1-2 $2-3$ $2-2$ $1-2$ $1-1$
676,130 577,737 576,349 576,266 575,633	14 4 2 3 2	0,00 21,73 21,73 21,73 21,73	18,34 43,18 43,24 43,24 43,26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 0-1 \\ 2, 1-2 \\ 0-1 \\ 2, 1-1 \\ 1-0 \end{array}$
572 ,637 571 ,384 571 ,302 570 ,636 498 ,911	16 15 14 14 4	0,08 0,03 0,03 0,00 18,33	21,73 21,73 21,73 21,73 43,18	$2p^2 ^3P - 2p^3 ^3P^\circ \ 2p^2 ^3P - 2p^3 ^3P^\circ \ 2p^3 ^3P - 2p^3 ^3P^\circ \ 2p^2 ^3P - 2p^3 ^3P^\circ \ 2p^3 ^3D^\circ - 2p^4 ^3P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
498,790 497,842 497,802 497,363 490,997	7 4 6 5 16	18,33 18,34 18,33 18,34 3,13	43,18 43,24 43,24 43,26 28,38	$\begin{array}{c} 2p^3 \ ^3D^{\circ} - 2p^4 \ ^3P \\ 2p^2 \ ^1D - 2p^3 \ ^1D^{\circ} \end{array}$	3-2 1-1 2-1 1-0 2-2
490,566 430,758 420,727 420,041 419,644	13 15 16 15 14	6,64 3,13 0,08 0,03 0,00	31,91 31,91 29,54 29,54 29,54	$\begin{array}{c} 2p^2 {}^{1}S - 2p^3 {}^{1}P^{\circ} \\ 2p^2 {}^{1}D - 2p^3 {}^{1}P^{\circ} \\ 2p^2 {}^{3}P - 2p^3 {}^{3}S^{\circ} \\ 2p^2 {}^{3}P - 2p^2 {}^{3}S^{\circ} \\ 2p^2 {}^{3}P - 2p^3 {}^{3}S^{\circ} \end{array}$	0—1 2—1 2—1 1—1 0—1
360,635 355,045 320,192 320,004 319,695	1 2 1 2 3	21,73 21,73 18,34 18,33 18,33	56,40 56,64 57,06 57,08 57,11	$2p^3 {}^3P^{\circ} - 3p {}^3D$ $2p^3 {}^3P^{\circ} - 3p^3 {}^3S$ $2p^3 {}^3D^{\circ} - 3p {}^3P$ $2p^3 {}^3D^{\circ} - 3p {}^3P$ $2p^3 {}^3D^{\circ} - 3p {}^3P$	$ \begin{array}{c} 2-3 \\ 1-4 \\ 1-0 \\ 2, 1-1 \\ 3-2 \end{array} $
290,608 290,461 290,440 290,147 288,267	2 2 3 4 1	21,73 21,73 21,73 21,73 21,73 29,54	64,39 64,41 64,41 64,45 72,55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-0 \\ 0-1 \\ 2, 1-1 \\ 2, 1-2 \\ 1-2 \end{array} $
279,834 270,225 269,225 269,076 268,817	3 6 2 3 1	28,38 6,64 18,34 18,33 18,33	72,68 52,52 64,39 64,41 64,45	$2p^{3} ^{1}D^{\circ} - ^{3}s' ^{1}D$ $2p^{2} ^{1}S - ^{3}s ^{1}P^{\circ}$ $2p^{3} ^{3}D^{\circ} - ^{3}s ^{3}P$ $2p^{3} ^{3}D^{\circ} - ^{3}s ^{3}P$ $2p^{3} ^{3}D^{\circ} - ^{3}s ^{3}P$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-0 \\ 2, 1-1 \\ 2-2 \end{array} $
268 ,785 254 ,595 254 ,491 251 ,026 249 ,228	4 1 2 10 1	18,33 21,73 21,73 3,13 31,91	64,45 70,42 70,44 52,52 81,65	$2p^3 \ ^3D^{\circ} - 3s \ ^3P$ $2p^3 \ ^3P^{\circ} - 3s' \ ^3D$ $2p^3 \ ^3P^{\circ} - 3s' \ ^3D$ $2p^3 \ ^1D - 3s \ ^1P^{\circ}$ $2p^3 \ ^1P^{\circ} - 3d' \ ^1P$	$\begin{array}{c} 3-2 \\ 2, \ 1-2 \\ 2-3 \\ 2-1 \\ 1-1 \end{array}$
243,922 243,796 243,736 240,371 240,275	4 3 2 7 7	21,73 21,73 21,73 0,08 0,03	72,55 72,58 72,59 51,65 51,63	$2p^3 \ ^3P^{\circ} - 3d \ ^3P$ $2p^3 \ ^3P^{\circ} - 3d \ ^3P$ $2p^3 \ ^3P^{\circ} - 3d \ ^3P$ $2p^2 \ ^3P - 3s^3 \ P^{\circ}$ $2p^2 \ ^3P - 3s \ ^3P^{\circ}$	$\begin{array}{c} 2, \ 1-2 \\ 2, \ 1, \ 0-1 \\ 1-0 \\ 2-1 \\ 1-0 \end{array}$
240,146 240,079 240,017 239,856 238,099	7 9 7 7 1	0,03 0,08 0,00 0,03 18,33	51 ,65 51 ,72 51 ,65 51 ,72 70 ,41	$2p^2$ 3P $-3s$ 3P ° $2p^3$ 3D ° $-3s'$ 3D	$ \begin{array}{c} 1-1 \\ 2-2 \\ 0-1 \\ 1-2 \\ 2, 1-1 \end{array} $
238,042 238,012 237,955 237,913 233,526	2 3 4 3 4	21,73 {21,73 {18,33 21,73 18,33 9,24	73,81 73,82 70,42 73,88 70,44 62,33	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1, 0-1 2, 1-2 2-2 2-3 3-3 2-1
233,393 233,297 233,222 233,159 229,261	5 2 6 2 2	9,24 28,38 9,24 28,38	62,36 81,52 62,40 81,55	$2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$ $2p^{3} {}^{1}D^{\circ} - 3d' {}^{1}F$ $2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$ $2p^{3} {}^{1}D^{\circ} - 3d' {}^{1}D$ $-$	2-2 2-3 2-3 2-2 -
228,645 227,211 227,101 227,079 226,944	1 4 5 3 6	18,33 18,34 18,33 18,33 18,33	72,55 72,90 72,93 72,93 72,96	$2p^3 \ ^3D^{\circ} - 3d \ ^3P$ $2p^3 \ ^3D^{\circ} - 3d \ ^3F$	3-2 1-2 2-3 3-3 3-4
223 ,497 223 ,456 223 ,394	1 2 3	18,34 18,33 18,33	73,81 73,82 73,83	$2p^3 \ ^3D^{\circ} - 3d \ ^3D \ 2p^3 \ ^3D^{\circ} - 3d \ ^3D \ 2p^3 \ ^3D^{\circ} - 3d \ ^3D$	2 · 1—1 2—2 3—3

	1	<u> </u>			
λ, Å	I	E _H , eV	E _B , eV	Transition	J
220,765	7	6,64	62,80	$2p^{2} {}^{1}S$ $-3d {}^{1}P^{\circ}$ $2p^{2} {}^{1}D$ $-3d {}^{3}F^{\circ}$	0—1
214,062	7	3,13	61,05		2—2
213,848	7	3,43	61,10	$2p^{2} ^{1}D - 3d ^{1}D^{\circ}$	$\begin{array}{c} 2-2 \\ 1, \ 0-2, \ 1 \\ 2-2 \\ 2, \ 1, \ 0-1 \\ 2-3 \end{array}$
210,547	1	21,73	80,61	$2p^{3} ^{3}P^{\circ} - 3d ^{3}D$	
210,480	1	21,73	80,63	$2p^{3} ^{3}P^{\circ} - 3d' ^{3}D$	
208,549	2	21,73	81,17	$2p^{3} ^{3}P^{\circ} - 3d' ^{3}S$	
208,254	9	3,13	62,66	$2p^{2} ^{1}D^{3} - 3d ^{1}F^{\circ}$	
203 ,152 201 ,465 201 ,222 201 ,160 201 ,101	1 4 6 8 6	0,08 18,33 0,08 0,08 0,03	61,10 79,87 61,69 61,71 61,68	$2p^2 {}^3P - 3d {}^3F^\circ$ $2p^3 {}^3D^\circ - 3d' {}^3F$ $2p^2 {}^3P - 3d {}^3D^\circ$ $2p^2 {}^3P - 3d {}^3D^\circ$ $2p^2 {}^3P - 3d {}^3D^\circ$	3, 2, 1—4, 3, 2 2—2 2—3 1—1
201,063	7	0,03	61,69	$2p^2$ 3P $-3d$ $^3D^\circ$	$egin{array}{c} 1-2 \\ 0-1 \\ 2-2 \\ 2-1 \\ 1-2 \\ \end{array}$
201,011	6	0,00	61,68	$2p^2$ 3P $-3d$ $^3D^\circ$	
200,089	7	0,08	62,04	$2p^2$ 3P $-3d$ $^3P^\circ$	
200,001	5	0,08	62,06	$2p^2$ 3P $-3d$ $^3P^\circ$	
199,934	5	0,03	62,04	$2p^2$ 3P $-3d$ $^3P^\circ$	
199,849 199,804 199,761 199,607 199,086	5 5 1 3	0,03 0,03 0,00 18,33 18,31	62,06 62,08 62,06 80,44 80,61	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{3} {}^{3}D^{\circ} - 3d' {}^{3}P$ $2p^{3} {}^{3}D^{\circ} - 3d' {}^{3}D$	1-1 1-0 0-1 3-2 2, 1-2, 1
199,004	3	18,33	80,63	$2p^{3} ^{3}D^{\circ} - 3d' ^{3}D$	$ \begin{array}{c} 3-3 \\ 2-3 \\ 0-1 \\ 2-3 \\ 2-2 \end{array} $
197,108	2	9,24	72,14	$2p^{3} ^{5}S^{\circ} - 3d ^{5}D$	
196,968	1	6,64	69,58	$2p^{2} ^{1}S - 4s ^{1}P^{\circ}$	
196,448	6	9,24	72,35	$2p^{3} ^{5}S^{\circ} - 3d ^{5}P$	
196,390	5	9,24	72,37	$2p^{3} ^{5}S^{\circ} - 3d ^{5}P$	
196,351	4	9,24	72,38	$2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{3} {}^{3}D^{\circ} - 4d {}^{3}F$ $2p^{3} {}^{3}D^{\circ} - 4d {}^{3}F$ $2p^{3} {}^{3}D^{\circ} - 4d {}^{3}D$ $2p^{2} {}^{3}P - 3p {}^{3}S^{\circ}$	2-1
188,758	1	18,33	84,04		2-3
188,656	2	18,33	84,00		3-4
187,916	1	18,33	84,32		3-3
187,240	3	0,08	66,29		2-1
187,105	2	0,03	66,29	$2p^2 ^3P - 3p ^3S^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 0 - 1 \\ 2 - 2 \\ 2 - 3 \end{array} $
186,558	1	3,13	69,58	$2p^2 ^1D - 4s ^1P^{\circ}$	
185,484	3	6,64	73,48	$2p^2 ^1S - 4d ^1P^{\circ}$	
181,655	2	0,08	68,32	$2p^2 ^3P - 3p ^3D^{\circ}$	
181,571	4	0,08	68,36	$2p^2 ^3P - 3p ^3D^{\circ}$	
181,521 179,943 179,827 178,805 178,724	4 2 1 1	0,03 0,00 0,08 0,00 0,03 0,08 0,03	68,32 68,30 68,97 68,94 68,97 69,41 69,40	$2p^{2} {}^{3}P - 3p {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3p {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 3p {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3p {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3p {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 4s {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 4s {}^{3}P^{\circ}$	1-2 $0-1$ $2-2$ $0-1$ $1-2$ $2-1$ $1-0$
178,670 178,540 178,126 177,971 176,367	3 1 1 2 4	0,08 0,03 0,03 3,13 3,13 3,13	69,46 69,41 69,46 72,73 72,79 73,42	$2p^2 \ ^3P - 4s \ ^3P^\circ$ $2p^2 \ ^3P - 4s \ ^3P^\circ$ $2p^2 \ ^3P - 4s \ ^3P^\circ$ $2p^2 \ ^3D - 4d \ ^3F^\circ$ $2p^2 \ ^1D - 4d \ ^1P^\circ$ $2p^2 \ ^1D - 4d \ ^1F^\circ$	2-2 1-1 1-2 2-2 2-2 2-3
171,066	3	3,13	75,60	$2p^{2} ^{1}D - 3p' ^{1}F^{\circ}$	2-3
170,187	2	3,13	75,98	$2p^{2} ^{1}D - 3p' ^{1}D^{\circ}$	2-2
169,839	3	0,08	73,07	$2p^{2} ^{3}P - 4d ^{3}D^{\circ}$	2-3
169,790	3	0,03	73,06	$2p^{2} ^{3}P - 4d ^{3}D^{\circ}$	1-2
169,748	2	0,00	73,04	$2p^{2} ^{3}P - 4d ^{3}D^{\circ}$	0-1
169,661 169,610 1 69,502	2 1 2	0,08 0,08 0,03	73,15 73,17 73,17	$\begin{array}{c} 2p^2\ ^3P-4d\ ^3P^\circ \\ 2p^2\ ^3P-4d\ ^3P^\circ \\ 2p^2\ ^3P-4d\ ^3P^\circ \end{array}$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 1-1 \end{array} $

λ, Å	I	$E_{_{ m H}}$, eV	$E_{\mathrm{B}},\;\mathrm{eV}\; \Bigg $	Transition	J
169,481 169,166	1 2	0,03 18,33	73 ,18 91 ,62	$\frac{2p^2\ ^3P-4d\ ^3P^{\circ}}{2p^3\ ^3D^{\circ}-4d'\ ^3F}$	$ \begin{array}{c} 1-0\\ 3, 2, 1-4, 3, 2 \end{array} $
168,450 166,499 166,444 164,612 158,925	2 2 2 2 1	3,13 9,24 9,24 3,13 3,13	76,73 83,70 83,72 78,44 81,14	$2p^{2} ^{1}D - 3p' ^{1}P^{\circ}$ $2p^{2} ^{5}S^{\circ} - 4d ^{5}P$ $2p^{2} ^{5}S^{\circ} - 4d ^{5}P$ $2p^{2} ^{1}D - 5d ^{1}F^{\circ}$ $2p^{2} ^{1}D - 6d ^{1}F^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2, 1 \\ 2-3 \\ 2-3 \end{array} $
158,601 151,005 150,977	1 1 1	0,08 0,08 —	78,25 82,18 —	$2p^{2} {}^{3}P - 5d {}^{3}D^{\circ} $ $2p^{2} {}^{3}P - 4p {}^{3}D^{\circ} $	$\begin{array}{c} 2 - 3 \\ 2 - 3 \\ - \end{array}$

F V, ground state $1s^2 \ 2s^2 \ 2p^{\ 2}P_{1/2}^0$ Ionization potential 921 450 cm⁻¹; 114,237 eV

	. poton			, 111,231 01	
λ, Å	I	$E_{ m H}^{},~{ m eV}$	$E_{_{\mathrm{D}}}$, eV	Transition	J
2736 ,91 2721 ,06 2712 ,88 2707 ,17 2703 ,96	0 0 0 2 1	77,10 77,04 77,01 77,10 70,11	81,63 81,59 81,58 81,68 74,70	$\begin{array}{c} 3s {}^{4}P^{\circ} - 3p {}^{4}D \\ 3p {}^{2}P^{\circ} - 3d {}^{2}D \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2702,30 2693,98 2461,33 2450,63 2252,72	1 1 1 2 2	$ \begin{cases} 77,04\\ 77,01\\ 70,09\\ 65,06\\ 65,06\\ 77,10 \end{cases} $	81,63 81,59 74,69 70,09 70,11 82,60	$3s {}^{4}P^{\circ} - 3p {}^{4}D$ $3s {}^{4}P^{\circ} - 3p {}^{4}D$ $3p {}^{2}P^{\circ} - 3d {}^{2}D$ $3s {}^{2}S - 3p {}^{2}P^{\circ}$ $3s {}^{2}S - 3p {}^{2}P^{\circ}$ $3s {}^{4}P^{\circ} - 3p {}^{4}S$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2229 ,18 1088 ,41 757 ,08 657 ,335 657 ,220	1 0 4 4 1	77,04 26,70 26,70 0,09 0,09	82,60 38,09 43,07 18,95 18,96	$3s \stackrel{4}{P}^{\circ} - 3p \stackrel{4}{S}$ $2p^{2} \stackrel{2}{P} - 2p^{3} \stackrel{2}{2}D^{\circ}$ $2p^{2} \stackrel{2}{P} - 2p^{3} \stackrel{2}{P}^{\circ}$ $2p \stackrel{2}{P} \stackrel{\circ}{-} 2p^{2} \stackrel{2}{P}$ $2p \stackrel{2}{P} \stackrel{\circ}{-} 2p^{2} \stackrel{2}{P}$ $2p \stackrel{2}{P} \stackrel{\circ}{-} 2p^{2} \stackrel{2}{P}$	3/2 - 3/2 $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$
654,034 647,879 526,298 525,292 524,597	3 1 3 3 2	0,00 18,95 10,74 10,70 10,67	18,95 38,09 34,30 34,30 34,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \end{array} $
514,087 513,975 508,079 506,163 466,995	1 2 4 3 5	18,96 18,95 0,09 0,00 0,09	43,07 43,07 24,49 24,49 26,64	$2p^{2} {}^{2}D - 2p^{3} {}^{2}P^{c} \ 2p^{2} {}^{2}D - 2p^{3} {}^{2}P^{c} \ 2p^{2} {}^{2}D - 2p^{2} {}^{2}S \ 2p {}^{2}P^{c} - 2p^{2} {}^{2}S \ 2p {}^{2}P^{c} - 2p^{2} {}^{2}P \ $	3/2 - 1/2 $5/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 1/2$
465,978 465,374 464,370 242,439 242,324	7 6 5 2 3	0,09 0,00 0,00 18,95 18,95	26,70 26,64 26,70 70,09 70,11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 3/2 $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 1/2$ $5/2 - 3/2$
235,840 226,608 226,341 206,594 206,430	1 2 2 3 2	{26,64 26,70 24,49 24,49 26,70 26,64	79,20 79,27 79,20 79,27 86,71 86,70	$2p^{2} {}^{2}P - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}P - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3s {}^{2}P^{\circ}$ $2p^{2} {}^{2}P - 3d {}^{2}D^{\circ}$ $2p^{2} {}^{2}P - 3d {}^{2}D^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
205 ,778 205 ,552	3 4	18,95 18,95	79,20 79,27	$^{2p^2}_{2p}^{2D}$ $\!\!\!\!-\!3s^{2P^\circ}_{2p^2}^{2D}$ $\!\!\!\!\!-\!3s^{2P^\circ}_{2P}^{c}$	$\frac{3}{2} - \frac{1}{2}$ $\frac{5}{2} - \frac{3}{2}$

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λ, Å	I	E _H . eV	E _B , eV	Transition	J
200 ,861 198 ,476 196 ,870	1 1 1	26,64 38,09 34,30	88,37 100,55 97,27	$2p^{2} {}^{2}P - 3s' {}^{2}P^{\circ} \ 2p^{3} {}^{2}D^{\circ} - 3s'' {}^{2}D \ 2p^{3} {}^{4}S^{\circ} - 3s'' {}^{4}P$	$^{5}/_{2}$, $^{3}/_{2}$ — $^{3}/_{2}$, $^{1}/_{2}$ $^{3}/_{2}$ — $^{5}/_{2}$, $^{3}/_{2}$
196,713 194,108 191,973 191,892 190,839	2 3 4 3 7	34,30 24,49 24,49 24,49 0,09	97,32 88,37 89,07 89,10 65,06	$2p^{3} {}^{4}S^{\circ} - 3s'' {}^{4}P$ $2p^{2} {}^{2}S - 3s' {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$ $2p^{2} {}^{2}S - 3d {}^{2}P^{\circ}$ $2p {}^{2}P^{\circ} - 3s {}^{2}S$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2, & 1/2 \\ 1/2 - 3/2 & 1/2 \\ 1/2 - 1/2 & 3/2 - 1/2 \end{array}$
190,571 189,943 187,008 186,968 186,879	6 2 4 4 3	$0,00\\43,07\\10,74\\10,70\\\{10,67\\10,70$	65,06 108,34 77,04 77,01 77,01 77,04	$2p^{2}P^{\circ}-3s^{2}S$ $2p^{3}{}^{2}P^{\circ}-3d'''^{2}D$ $2p^{2}{}^{4}P-3s^{4}P^{\circ}$ $2p^{2}{}^{4}P-3s^{4}P^{\circ}$ $2p^{2}{}^{4}P-3s^{4}P^{\circ}$ $2p^{2}{}^{4}P-3s^{4}P^{\circ}$ $2p^{2}{}^{4}P-3s^{4}P^{\circ}$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2}, \ 1/_{2} - 5/_{2}, \ 3/_{2} \\ 5/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array}$
186,842 186,788 186,715 183,016 182,979	5 4 4 3 4	10,74 10,67 10,70 18,95 18,95	77,10 77,04 77,10 86,70 86,71	$2p^{2} \stackrel{4}{P} - 3s \stackrel{4}{P}^{\circ} \ 2p^{2} \stackrel{4}{P} - 3s \stackrel{4}{P}^{\circ} \ 2p^{2} \stackrel{4}{P} - 3s \stackrel{4}{P}^{\circ} \ 2p^{2} \stackrel{2}{P} - 3d \stackrel{2}{P}^{\circ} \ 2p^{2} \stackrel{2}{P} - 3d \stackrel{2}{P}^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array}$
178,612 178,590 178,434 174,698 174,568	3 4 5 4 3	18,95 18,95 18,95 26,70 26,64	88,37 88,38 88,43 97,66 97,66	$2p^2 \ ^2D - 3s' \ ^2P^\circ \ 2p^2 \ ^2D - 3d \ ^2F^\circ \ 2p^2 \ ^2D - 3d' \ ^2D^\circ \ 2p^2 \ ^2P - 3d' \ ^2D^\circ \ 2p^2 \ ^2P - 3d' \ ^2D^\circ \ $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
174,513 174,490 173,020 171,302 171,241	3 1 2 1	38,09 38,09 26,70 34,30 34,30	109,14 109,14 98,35 106,67 106,70	$2p^{3} {}^{2}D^{\circ} - 3d''' {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 3d''' {}^{2}F$ $2p^{2} {}^{2}P - 3d' {}^{2}P^{\circ}$ $2p^{3} {}^{4}S^{\circ} - 3d'' {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d'' {}^{4}P$	$\begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2, & 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
167,858 166,177 165,983 163,596 163,558	1 10 9 2 5	24,49 0,09 0,00 10,74 10,74	98,35 74,70 74,69 86,53 86,54	$2p^{2} {}^{2}S - 3d' {}^{2}P^{\circ} \ 2p^{2} {}^{2}P^{\circ} - 3d {}^{2}D \ 2p^{2} {}^{2}P^{\circ} - 3d {}^{4}D^{\circ} \ 2p^{2} {}^{4}P - 3d {}^{4}D^{\circ} \ 2p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
163,501 163,456 162,270 162,215 162,172	4 3 4 3 3	10,70 10,67 10,74 10,74 10,70	86,53 86,51 87,14 87,17 87,14	$2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}D^{\circ}$ $2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}D^{\circ}$ $2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}P^{\circ}$ $2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}P^{\circ}$ $2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2, & 1/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
162,121 162,082 162,053 162,013 158,537	2 3 3 2 4	10,70 10,70 10,67 10,67 18,95	87,17 87,19 87,17 87,19 97,15	$2p^{2} \stackrel{4}{4}P - 3d \stackrel{4}{4}P^{\circ} \\ 2p^{2} \stackrel{2}{2}D - 3d' \stackrel{2}{2}F^{\circ}$	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 5/_{2}, \ 3/_{2} - 7/_{2}, \ 5/_{2} \end{array}$
157 ,515 152 ,563 152 ,511 152 ,391 152 ,339	1 2 4 3 2	18,95 0,09 0,09 0,00 0,00	97,66 81,35 81,38 81,35 81,38	$2p^{2} {}^{2}D - 3d' {}^{2}D^{\circ} \ 2p {}^{2}P^{\circ} - 3p {}^{2}P \ 2p {}^{2}P - 3p {}^{2}P \ 2p {}^{2}P^{\circ} - 3p {}^{2}P \ 2p {}^{3}P^{\circ} - 3p {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
148 ,108 148 ,002 147 ,946 145 ,547 145 ,392	1 5 4 3 2	0,09 0,09 0,00 0,00 0,00	83,80 83,86 83,80 85,27 85,27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
145,177 144,673 144,637 143,897 140,414	1 1 1 1	18,95 18,95 18,95 18,95 0,09	104,35 104,65 104,67 105,11 88,39	$\begin{array}{c} 2p^2 \ ^2D - 4d \ ^2D^{\circ} \\ 2p^2 \ ^2D - 3p''' \ ^2F^{\circ} \\ 2p^2 \ ^2D - 3p''' \ ^2F^{\circ} \\ 2p^2 \ ^2D - 4d \ ^2F^{\circ} \\ 2p \ ^2P^{\circ} - 4s \ ^2S \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $

λ, λ	I	E _{II} , eV	E _B . eV	Transition	.1
138,181 136,902 134,539 134,407 153,662	1 3 5 4 1	10,74 10,74 0,09 0,00 10,74	100,46 101,30 92,24 92,24 103,49	$2p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$ $2p^{2} {}^{4}P - 3p'' {}^{4}D^{\circ}$ $2p {}^{2}P^{\circ} - 4d {}^{2}D$ $2p {}^{2}P^{\circ} - 4d {}^{2}D$ $2p {}^{2}P - 3p'' {}^{4}S^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
133,208 132,819 132,699 132,511 132,484	1 2 1 3 3	0,09 0,09 0,00 10,74 10,70	93,16 93,44 93,44 104,30 104,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2, & 1/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2, & 3/2 \end{array} $
132,453 132,310 131,638 131,516 123,774	2 1 0 0 1	10,67 10,74 0,09 0,00 0,09	104,27 104,44 94,27 94,27 100,26	$2p^{2} {}^{4}P - 4d {}^{4}D^{\circ}$ $2p^{2} {}^{4}P - 4d {}^{4}P^{\circ}$ $2p {}^{2}P^{\circ} - 3p' {}^{2}S$ $2p {}^{2}P^{\circ} - 3p' {}^{2}S$ $2p {}^{2}P^{\circ} - 5d {}^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
123,665 120,032 119,986	0 0 0	0,00 0,09 0,00	100,26 103,39 103,34	$\frac{2p}{2}P^{\circ}-5d^{\circ}D$ $\frac{2p}{2}P^{\circ}-4p^{\circ}D$ $\frac{2p}{2}P^{\circ}-4p^{\circ}D$	$^{1/2}_{^{2}_{-}^{3}/2}^{3/2}_{^{2}_{-}^{5/2}}$ $^{1/2}_{^{2}_{-}^{3/2}}^{-}$

F VI, ground state $1s^2 2s^{2} {}^1S_0$ Ionization potential 1 267 581 cm⁻¹; 157,151 eV

λ, λ	I	$E_{ m H},~{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
4592,85	1	98,00	100,70	$3p \ ^3P^{\circ} - 3d \ ^3D$	2—3
2327,28	5	92,65	97,97	$3s \ ^3S - 3p \ ^3P^{\circ}$	1—0
2323,35	7	92,65	97,98	$3s \ ^3S - 3p \ ^3P^{\circ}$	1—1
2315,39	9	92,65	98,00	$3s \ ^3S - 3p \ ^3P^{\circ}$	1—2
1139,60	2	23,16	34,04	$2p \ ^1P^{\circ} - 2p^2 \ ^1D$	1—2
648,50	1	12,08	31,20	$2p \ ^{3}P^{\circ} - 2p^{2} \ ^{3}P$	2—1
647,31	1	12,01	31,16		1—0
646,36	3	12,08	31,26		2—2
646,10	1	12,01	31,20		1—1
645,02	1	11,98	31,20		0—1
643,98 535,204 194,840 173,145 164,015	1 10 1 1	12,01 0,00 34,04 23,16 34,04	31,26 23,16 97,67 94,77 109,63	$\begin{array}{c} 2p\ ^3P^{\circ}-2p^2\ ^3P \\ 2s^2\ ^1S-2p\ ^1P^{\circ} \\ 2p^2\ ^1D-3p\ ^1P^{\circ} \\ 2p\ ^1P^{\circ}-3s\ ^1S \\ 2p^2\ ^1D-3s\ ^1P^{\circ} \end{array}$	1-2 0-1 2-1 1-0 2-1
163,138	2	42,20	118,20	$\begin{array}{c} 2p^2 \ ^1S - 3d \ ^1P^\circ \\ 2p^2 \ ^3P - 3s \ ^3P^\circ \end{array}$	0-1
161,477	1	31,26	108,04		2-1
161,414	1	31,20	108,00		1-0
161,341	1	31,20	108,04		1-1
161,308	3	31,26	108,12		2-2
161,257	1	31,16	108,04	$2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$	0-1
161,174	1	31,20	108,12	$2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$	1-2
156,247	6	23,16	102,51	$2p {}^{1}P^{\circ} - 3d {}^{1}D$	1-2
154,506	3	34,04	114,28	$2p^{2} {}^{1}D - 3d {}^{1}D^{\circ}$	2-2
153,880	4	12,08	92,65	$2p {}^{3}P^{\circ} - 3s {}^{3}S$	2-1
153,741	3	12,01	92,65	$\begin{array}{c} 2p \ ^{3}P^{\circ}-3s \ ^{3}S \\ 2p \ ^{3}P^{\circ}-3s \ ^{3}S \\ 2p^{2} \ ^{1}D-3d \ ^{1}F^{\circ} \\ 2p^{2} \ ^{3}P-3d \ ^{3}D^{\circ} \\ 2p^{2} \ ^{3}P-3d \ ^{3}D^{\circ} \end{array}$	1-1
153,678	2	11,98	92,65		0-1
148,653	4	34,04	117,44		2-3
146,718	2	31,26	115,76		2-2
146,676	4	31,26	115,78		2-3

λ. Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
146,613 146,576 145,691 145,630 145,585	3 2 3 1 1	31,20 31,16 31,26 31,26 31,20	115,76 115,74 116,36 116,39 116,36	$2p^2$ 3P $-3d$ 3D $^{\circ}$ $2p^2$ 3P $-3d$ 3D $^{\circ}$ $2p^2$ 3P $-3d$ 3P $^{\circ}$ $2p^2$ 3P $-3d$ 3P $^{\circ}$ $2p^2$ 3P $-3d$ 3P $^{\circ}$	$egin{array}{c} 1-2 \\ 0-1 \\ 2-2 \\ 2-1 \\ 1-2 \end{array}$
145,489 145,462 141,154 139,900 139,800	1 1 2 7 6	31,20 31,16 23,16 12,08 12,01	116,41 116,39 111,00 100,70 100,69	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p {}^{1}P^{\circ} - 3p {}^{1}P$ $2p {}^{3}P^{\circ} - 3d {}^{3}D$ $2p {}^{3}P^{\circ} - 3d {}^{3}D$	1-0 0-1 1-1 2-3 1-2, 1
139,758 135,397 126,923 124,474 124,400	5 3 5 0 0	11,98 23,16 0,00 12,08 12,01	100,69 114,73 97,67 111,68 111,63	$2p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $2p \ ^{1}P^{\circ} - 3d \ ^{1}D$ $2s^{2} \ ^{1}S - 3p \ ^{1}P^{\circ}$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}D$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}D$	0-1 $1-2$ $0-1$ $2-2$ $1-1$
124,387 123,175 123,091 123,051 122,251	3 1 0 0 0	12,01 12,08 12,01 11,98 12,08	111,68 112,73 112,73 112,73 113,49	$2p \ ^{3}P^{\circ} - 3p \ ^{3}D$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}S$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}P$	2, 1, 0—3, 2, 1 2—1 1—1 0—1 2—1
122,200 122,169 122,122 120,116 116,094	2 0 1 1 0	12,08 12,01 12,01 23,16 34,04	113,53 113,49 113,53 126,38 140,83	$2p \ ^{3}P^{\circ} - 3p \ ^{3}P$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}P$ $2p \ ^{3}P^{\circ} - 3p \ ^{3}P$ $2p \ ^{3}P^{\circ} - 4d \ ^{1}D$ $2p \ ^{2}1D - 4d \ ^{1}F^{\circ}$	1-0; 2-2, 1-1 0-1; 1-2 1-2 2-3
113,840 109,040 108,975 99,203 99,105 99,044	0 1 1 0 0	31,26 12,08 12,01 0,00 12,08 12,01	140 ,14 125 ,77 — 124 ,95 137 ,17	$2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p {}^{3}P^{\circ} - 4d {}^{3}D$ $2p {}^{3}P^{\circ} - 4d {}^{3}D$ $2s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$ $2p {}^{3}P^{\circ} - 5d {}^{3}D$ $2p {}^{3}P^{\circ} - 5d {}^{3}D$	$\begin{array}{c} 2-3 \\ 2-3 \\ 1, 0-2, 1 \\ 0-1 \\ 2-3 \\ 1, 0-2, 1 \end{array}$

Ne I, ground state $1s^2 \ 2s^2 \ 2p^6 \ 'S_0$ Ionization potential 173 931,7 cm $^{-1}$; 21,564 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J
24935 ,6	7	20,21	20,71	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \\ 4s \ [^{1}/_{2}]^{\circ} - 4p \ [^{2}/_{2}] \end{array}$	2—2
24777 ,7	15	20,21	20,71		1—2
24458 ,7	36	20,30	29,80		2—3
24448 ,5	20	20,30	20,80		1—2
24366 ,4	95	19,69	20,20		1—2
24248,9	32	19,78	20,29	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [4^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \end{array}$	1-1
24161,5	25	20,29	20,80		1-2
24097,8	11	20,20	20,71		2-2
23978,4	68	20,19	20,70		3-4
23956,2	47	19,78	20,30		1-1
23951,3	119	19,78	20,30	$4s' [1/2]^{\circ} - 4p' [11/2]$	1-2
23709,4	62	19,69	20,21	$4s [1^{1}/2]^{\circ} - 4p [1^{1}/2]$	1-1
23636,3	205	19,66	20,19	$4s [1^{1}/2]^{\circ} - 4p [2^{1}/2]$	2-3
23565,6	40	19,69	20,21	$4s [1^{1}/2]^{\circ} - 4p [1^{1}/2]$	1-2
23372,1	62	19,76	20,29	$4s' [1/2]^{\circ} - 4p' [1^{1}/2]$	0-1
23260,7	45	19,66	20,20	$4s [1^{1}/_{2}]^{\circ}-4p [2^{1}/_{2}]$	2—2
23101,0	62	19,76	20,30	$4s' [1/_{2}]^{\circ}-4p' [1/_{2}]$	0—1
22662,5	15	19,66	20,21	$4s [1^{1}/_{2}]^{\circ}-4p [1^{1}/_{2}]$	2—1
22529,7	105	19,66	20,21	$4s [1^{1}/_{2}]^{\circ}-4p [1^{1}/_{2}]$	2—2
22468,4	8	20,15	20,70	$4p [1/_{2}]-4d [1/_{2}]^{\circ}$	1—0
22428,2 22245,3 21707,4 21040,9 20350,6	15 12 25 27 10	20,15 20,15 19,69 19,78 19,69	20,71 20,71 20,26 20,37 20,30	$\begin{array}{c} 4p \ [^{1}/_{2}] - 4d \ [^{11}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{11}/_{2}]^{\circ} \\ 4s \ [^{11}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4s \ [^{11}/_{2}]^{\circ} - 4p' \ [^{11}/_{2}] \end{array}$	$ \begin{array}{c} 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 1 - 0 \\ 1 - 2 \end{array} $
19574,0 18624,94 18618,69 18597,30 18591,12	10 20 15 120 25	19,69 20,05 20,05 20,05 20,05	20,30 20,71 20,71 20,71 20,71	$4s [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}-4f [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}-4f [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}-4f [3^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}-4f [3^{1}/_{2}]$	$ \begin{array}{c} 2-2 \\ 3-2, 3 \\ 2-2, 3 \\ 3-3, 4 \\ 2-3 \end{array} $
18475,79	3	20,14	20,81	$3d' [1^{1}/_{2}]^{\circ}-4f' [2^{1}/_{3}]$	$ \begin{array}{c} 1-2 \\ 1-1, 2 \\ 2-2, 3 \\ 1-2 \\ 3-3, 4 \end{array} $
18458,58	10	20,04	20,71	$3d [1^{1}/_{2}]^{\circ}-4f [1^{1}/_{2}]$	
18422,43	110	20,14	20,81	$3d' [1^{1}/_{2}]^{\circ}-4f' [2^{1}/_{2}]$	
18403,16	60	20,04	20,71	$3d [1^{1}/_{2}]^{\circ}-4f [2^{1}/_{2}]$	
18390,10	180	20,14	20,81	$3d' [2^{1}/_{2}]^{\circ}-4f' [3^{1}/_{2}]$	
18385,17	160	20,14	20,81	$3d' [2^{1}/_{2}]^{\circ}$ — $4f' [3^{1}/_{2}]$	2-3
18359,21	6	20,04	20,71	$3d [1^{1}/_{2}]^{\circ}$ — $4f [1^{1}/_{2}]$	2-1, 2
18304,00	140	20,04	20,71	$3d [1^{1}/_{2}]^{\circ}$ — $4f [2^{1}/_{2}]$	2-2, 3
18282,58	200	20,03	20,71	$3d [3^{1}/_{2}]^{\circ}$ — $4f [4^{1}/_{2}]$	3-4
18276,59	260	20,03	20,71	$3d [3^{1}/_{2}]^{\circ}$ — $4f [4^{1}/_{2}]$	4-4, 5
18226,57	10	20,03	20,71	$3d [3^{1}/_{2}]^{\circ}$ — $4f [3^{1}/_{2}]$	3-3, 4
18220,76	15	20,03	20,71	$3d [3^{1}/_{2}]^{\circ}$ — $4f [3^{1}/_{2}]$	4-3, 4
18082,71	130	20,02	20,71	$3d [^{1}/_{2}]^{\circ}$ — $4f [4^{1}/_{2}]$	1-1, 2
18035,49	20	20,02	20,71	$3d [^{1}/_{2}]^{\circ}$ — $4f [4/^{1}_{2}]$	0-1
15234,4	2	18,96	19,78	$3p' [^{1}/_{2}]$ — $4s' [^{1}/_{2}]^{\circ}$	0-1
12912,4 12690,1 12594,8 12459,49 12066,38	2 2 1 2 15	18,70 18,71 18,70 18,69 18,63	19,66 19,69 19,69 19,69 19,66	$3p' [1^{1}/_{2}]-4s [1^{1}/_{2}]^{\circ}$ $3p [1/_{2}]-4s [1^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}]-4s [1^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}]-4s [1^{1}/_{2}]^{\circ}$ $3p [1^{1}/_{2}]-4s [1^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 2-2 \\ 0-1 \\ 2-1 \\ 1-1 \\ 2-2 \end{array} $
11984,99	10	18,72	19,76	$3p' [1/2] - 4s' [1/2]^{\circ}$	1-0
11789,93	10	18,61	19,66	$3p [1^{1}/2] - 4s [1^{1}/2]^{\circ}$	1-2
11789,11	50	18,63	19,69	$3p [1^{1}/2] - 4s [1^{1}/2]^{\circ}$	2-1

λ, Å	I	$E_{_{ m H}},~{ m eV}$	$E_{ m B}$, eV	Transition	J
11766,87	60	18,72	19,78	3p' [1 ¹ / ₂]—4s' [¹ / ₂]°	1—1
11688,08	10	18,96	20,02	$3p'[1/2] - 3d[1/2]^{\circ}$	0—1
11614,18 11601,62	80 25	18,69 18,71	19,76 19,78	$3p' [1^{1}/_{2}] - 4s' [1/_{2}]^{\circ}$ $3p [1/_{2}] - 4s' [1/_{2}]^{\circ}$	1-0 0-1
11536,41 11525,11	50 90	18,96 18,61	20,04 19,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0—1 1—1
11522,82 11409,24	150 100	18,70 18,69	19,78 19,78	$3p' [1^{1}/_{2}] - 4s' [1/_{2}]^{\circ}$ $3p' [1^{1}/_{2}] - 4s' [1/_{2}]^{\circ}$	2—1 1—1
11390,53	11 0	57, 18	19,66	$3p \ [1^{1/2}] - 4s \ [7^{2}]$ $3p \ [2^{1/2}] - 4s \ [1^{1/2}]^{\circ}$ $4s \ [1^{1/2}]^{\circ} - 5p \ [2^{1/2}]$	$\begin{array}{c} 1 - 1 \\ 2 - 2 \\ 1 - 2 \end{array}$
11366,80 11333,60	3 3	19,69 19,78	20 ,78 20 ,87	$4s' [1/2]^{\circ} - 5p' [11/2]$	1—1
11329,56 11304,47	1 2	19,78 19,69	20,87 20,78	$4s' [1/2]^{\circ} - 5p' [1/2]$ $4s [11/2]^{\circ} - 5p [11/2]$	1—1 1—1
11303,96 11298,45	$egin{array}{c} 2 \ 5 \ 1 \end{array}$	19,78 19,66	20,88 20,76	$4s' [1/2]^{\circ} - 5p' [11/2]$	$\begin{array}{c} 1 - 2 \\ 2 - 1 \end{array}$
11293,00 11177,59	$\frac{1}{2}$	19,69 18,55	20,78 19,66	$4s \ [1^{1}/_{2}]^{\circ} - 5p \ [1/_{2}]^{\circ}$ $4s \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}]$ $3p \ [2^{1}/_{2}] - 4s \ [1^{1}/_{2}]^{\circ}$	$\begin{array}{c} 1 - 2 \\ 3 - 2 \end{array}$
11160,29	10	19,66	20,77	$4s \left[1^{1}/_{2}\right]^{\circ} - 5p \left[2^{1}/_{2}\right]$	2—3
11143,09 11138,55	$\begin{array}{c} 300 \\ 4 \end{array}$	18,57 19,76	19,69 20,87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 0—1
11134,62 11120,37	4 5	19,76 19,66	20 ,87 20 ,78	$4s' \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-5p' \begin{bmatrix} 1/2 \end{bmatrix}$ $4s \begin{bmatrix} 1^1/2 \end{bmatrix}$ ° $-5p \begin{bmatrix} 2^1/2 \end{bmatrix}$	$0-1 \\ 2-2$
11060,88	2	19,66	20,78	$4s \left[1^{1}/_{2}\right]^{\circ} - 5p \left[1^{1}/_{2}\right]$	2—1
11049,80 11044,06	20 15	19,66 19,78	20,78 20,90	$4s \left[\frac{1}{2}\right]^{\circ} - 5p \left[\frac{1}{2}\right]$ $4s' \left[\frac{1}{2}\right]^{\circ} - 5p' \left[\frac{1}{2}\right]$	$\begin{array}{c} 2-2 \\ 1-0 \end{array}$
11020,93 10888,53	10 8	$\begin{array}{c} \textbf{19,69} \\ \textbf{20,05} \end{array}$	20,81 21,18	$4s \ [1^{1}/_{2}]^{\circ} -5p \ [^{1}/_{2}]$ $3d \ [2^{1}/_{2}]^{\circ} -6f \ [3^{1}/_{2}]$	1-0 3-3, 4
10886,35	5 200	20,05	21,18	$3d \left[\frac{2^{1}}{2} \right]^{\circ} - 6f \left[\frac{3^{1}}{2} \right]$	2-3
10844,54 10838,30 10830,33	3	$\substack{18,63\\20,04}$	19,78 21,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 1— —
10819,95	4 5	20,14	21,28	$3d' [1^{1}/_{2}]^{\circ} -6f' [2^{1}/_{2}]$	2-2, 3
10814,83 10808,22	4 7	20,04 20,14	21,18 21,28	$3d [1^{1}/_{2}]^{\circ} - 6f [2^{1}/_{2}]$ $3d' [2^{1}/_{2}]^{\circ} - 6f' [3^{1}/_{2}]$	$\begin{array}{c} 1-2 \\ 3-3 \end{array}$
10806,43 10798,12	5 150	20,14 18,61	21,28 19,76	$3d' [2^{1/2}]^{\circ} - 6f' [3^{1/2}]$ $3p [1^{1/2}] - 4s' [1/2]^{\circ}$	$\begin{array}{c} 3 & 3 \\ 2 - 3 \\ 0 - 1 \end{array}$
10789,37	2	20,03	21,18	$3d [3^{1}/2]^{-43} [73]$	3——
10780,57 10766,15	6 1 0	$20,04 \\ 20,05$	21,18 21,20	$3d [1^{1}/_{2}]^{\circ}$ — $6f [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}$ — 170990	2-2, 3 3-2
10764,09 10760,34	12 1	$20,05 \\ 20,03$	21,20 21,18	$3d \left[\frac{2^{1}}{2}\right]^{\circ} - 170990$ $3d \left[\frac{3^{1}}{2}\right]^{\circ} - 6f \left[\frac{3^{1}}{2}\right]$	$\begin{array}{c} 2-2\\ 3-3, 4 \end{array}$
10758,28	2	20,03	21,18	$3d \left[3^{1}/_{2} \right] - 6f \left[3^{1}/_{2} \right]$	4-3, 4
10690,48 10673,80	$rac{6}{2}$	$20,02 \\ 20,02$	21,18 21,18	$3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 6f \begin{bmatrix} 1^{1}/2 \end{bmatrix}$ $3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 6f \begin{bmatrix} 1^{1}/2 \end{bmatrix}$	1-1, 2 0-1
10620,63 10562,43	$\begin{array}{c} 40 \\ 200 \end{array}$	18,61 18,96	19,78 20,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 0—1
10432,53	3	19,69	20,88	$4s [1^{1}/_{2}]^{\circ} - 5p' [1^{1}_{2}]$	$\tilde{1}$ -2
10295,40 10245,70	80 7	18,57 19,66	19 ,78 20 ,87	$3p [2^{1}/_{2}]$ — $4s' [1/_{2}]^{\circ}$ $4s [1/^{1}_{2}]^{\circ}$ — $5p' [1/_{2}]$	2—1 2—1
10224,6 10210,73	$\frac{2}{2}$	19,66 19,69	$20,88 \\ 20,90$	$4s [1^{1}/_{2}]^{\circ} -5p' [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ} -5p' [1/_{2}]$	2—2 1—0
10091,53	3	20,14	21,36	$3d' [2^{1}/_{2}]^{\circ}$ —172319	3—2
10038,9 10037,1	$\frac{2}{2}$	20,05 $20,05$	21,28 21,28	$3d [2^{1}/_{2}]^{\circ} - 6f' [3^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ} - 6f' [3^{1}/_{2}]$	3-3, 4 2-3
10008,55 10007,31	$\frac{4}{30}$	$20,05 \\ 20,05$	21,29 21,29	$3d \ [2^{1}/_{2}]^{\circ} -7f \ [2^{1}/_{2}]$ $3d \ [2^{1}/_{2}]^{\circ} -7f \ [3^{1}/_{2}]$ $3d \ [2^{1}/_{2}]^{\circ} -7f \ [3^{1}/_{2}]$	$\begin{array}{c} 3-2,\ 3\\ 3-3,\ 4 \end{array}$
10005,54 200	20	20,05	21,29	$3d \left[2^{1}/_{2} \right]^{\circ} - 7f \left[3^{1}/_{2} \right]$	2—3

λ, Λ	I	$E_{ m H}$. eV	$E^{}_{ m B}$, eV	Transition	J
9974,2 9963,55 9947,94 9944,9 9944,1	2 6 15 2 7	20,04 20,14 20,14 20,04 20,04	21,28 21,38 21,38 21,28 21,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-2, 3 \\ 2-2, 3 \\ 1-2 \end{array} $
9938,35 9936,83 9918,52 9915,13 9902,31	15 10 4 20 30	20,14 20,14 20,04 20,04 20,05	21,38 21,38 21,29 21,29 21,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2, 3 $ 2-2, 3 $ $ 2-1, 2 $ $ 2-2, 3 $ $ 3-2$
9900,58 9899,06 9897,30 9875,90 9837,47	40 2 3 2 20	20,05 20,03 20,03 20,05 20,02	21,30 21,29 21,29 21,30 21,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2 3-3, 4 4-3, 4 2-1 1-1, 2
9823,42 9788,1 9741,3 9728,2 9724,8	5 2 1 1 1	20,04 19,78 20,02 20,14 19,78	21,31 21,05 21,29 21,41 21,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 1-1 0-1 2 1-2
9702,40 9665,424 9642,2 9592,19 9584,79	3 1000 1 5 3	20 ,02 18 ,38 19 ,76 —	21 ,30 19 ,66 21 ,05 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 1-2 0-1 -
9573,99 9547,40 9534,167 9508,4 9506,59	2 300 500 5 3	19,78 18,72 18,72 20,05	21,07 20,02 20,02 21,35	$4s' [1/2]^{\circ} -6p [1/2]$ $3p' [1/2] -3d [1/2]^{\circ}$ $3p' [1/2] -3d [1/2]^{\circ}$ $3d [2^{1}/2]^{\circ} -8f [3^{1}/2]$ -	1-0 1-0 1-1 2-3
9486,680 9467,81 9459,21 9454,0 9452,08	500 2 300 1 10	18,38 20,14 18,72 20,14 20,04	19,69 21,45 20,04 21,45 21,35	$\begin{array}{c} 3p \ [^{1}/_{2}] - 4s \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 8f' \ [^{2}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3d' \ [^{1}/_{2}]^{\circ} - 8f' \ [^{2}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 8f \ [^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1-1 \\ 1-2 \\ 1-2 \\ 2-2, 3 \\ 1-1, 2 \end{array} $
9445,26 9443,8 9432,94 9425,38 9412,32	$\begin{array}{c} 3 \\ 2 \\ 40 \\ 500 \\ 4 \end{array}$	20,14 20,14 18,72 18,71 20,03	21,45 21,45 20,04 20,02 21,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2, 3 $ 2-2, 3 $ $ 1-2 $ $ 0-1 $ $ 3-3, 4$
9410,75 9405,75 9377,2 9373,28 9353,3	6 8 5 200 3	20,03 20,03 18,72 18,70 20,02	21,35 21,35 20,05 20,02 21,35	$\begin{array}{c} 3d \ [3^{1}/_{2}]^{\circ} - 8f \ [3^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 8f \ [^{1}/_{2}] \end{array}$	$\begin{array}{c} 4-3,\ 4\\ 3-2,\ 3\\ 1-2\\ 2-1\\ 1-1,\ 2 \end{array}$
9340 ,5 9326 ,52 9313 ,98 9310 ,58 9300 ,85	2 600 300 150 600	20,02 18,71 18,70 18,70 18,70	21,35 20,04 20,03 20,02 20,04	$\begin{array}{c} 3d \ [^{1}/_{2}]^{\circ} - 8f \ [^{1}/_{2}] \\ 3p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 3d \ [^{3}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 0-1 2-3 1-0 2-1
9275,53 9226,67 9221,88 9221,59 9220,05	100 200 150 200 400	18,70 18,70 18,70 18,70 18,70	20,04 20,04 20,04 20,05 20,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 2-2 \\ 2-3 \end{array} $
9212,9 9201,76 9191,8	$\begin{array}{c} 2\\600\\3\end{array}$	20,05 18,69 —	21,39 20,04 —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 1-1 -

λ, Å	I	$E_{ m H},~{ m eV}$	$E_{_{ m B}},~{ m eV}$	Transition	J
9148 ,68	600	18,69	20,05	$3p' [1^{1}/_{2}] - 3d [2^{1}/_{2}]^{\circ}$	1-2
9121 ,14	20	20,03	21,39	$3d [3^{1}/_{2}]^{\circ} - 172553$	4-3
9103,53	3	20,03	21,40	$3d \ [3^{1}/_{2}]^{\circ} - 9f \ [3^{1}/_{2}]$	3-3, 4
9102,1	1	20,03	21,40	$3d \ [3^{1}/_{2}]^{\circ} - 9f \ [3^{1}/_{2}]$	4-3, 4
9073,04	8	19,69	21,05	$4s \ [1^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}]$	1-2
9052,54	6	19,69	21,06	$4s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}]$	1-1
9049,06	3	19,69	21,06	$4s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}]$	1-2
9046,8 9039,0 9036,98 8988,58 8968,6	$\begin{array}{c} 1 \\ 3 \\ 6 \\ 200 \\ 2 \end{array}$	20,02 20,04 19,78 18,38 19,66	21,40 21,41 21,15 19,76 21,05	$\begin{array}{c} 3d \ [^{1}/_{2}]^{\circ} - 9f \ [^{2}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 172698 \\ 4s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 3p \ [^{1}/_{2}]^{\circ} - 4s' \ [^{1}/_{2}]^{\circ} \\ 4s \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 11 \\ 1-2 \\ 1-0 \\ 2-1 \end{array} $
8962,34 8948,12 8941,47 8929,24 8927,4	$\begin{array}{c} 3 \\ 7 \\ 6 \\ 10 \\ 2 \end{array}$	19,78 20,02 19,69 19,66 19,76	21,16 21,41 21,07 21,05 21,15	$\begin{array}{c} 4s' \left[\frac{1}{2} \right]^{\circ} - 6p' \left[\frac{1}{2} \right] \\ 3d \left[\frac{1}{2} \right]^{\circ} - 172698 \\ 4s \left[\frac{1}{2} \right]^{\circ} - 6p \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 6p \left[\frac{21}{2} \right] \\ 4s' \left[\frac{1}{2} \right]^{\circ} - 6p' \left[\frac{1}{2} \right] \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 \\ 1 - 0 \\ 2 - 3 \\ 0 - 1 \end{array} $
8919,4987 8915,44 8913,0	300 3 3	18,63 19,66	20,02 21,05	$3p [1^{1}/_{2}] - 3d [^{1}/_{2}]^{\circ}$ $4s [1^{1}/_{2}]^{\circ} - 6p [2^{1}/_{2}]$	2—1 2—2 —
8895 ,6	2	19,66	21,06	$4s [1^{1}/_{2}]^{\circ} - 6p [1^{1}/_{2}]$	$\begin{array}{c} 2-1 \\ 2-2 \end{array}$
8892 ,22	10	19,66	21,06	$4s [1^{1}/_{2}]^{\circ} - 6p [1^{1}/_{2}]$	
8865,7562 8865,3057 8853,8669 8830,9078 8820,36	500 100 700 50 6	18,63 18,38 18,63 18,63	20,03 19,78 20,04 20,04	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 1—1 2—2 2—1
8792,51	30	18,72	20,14	$3p' \begin{bmatrix} 1/_2 \end{bmatrix} - 3d' \begin{bmatrix} 2^{1}/_2 \end{bmatrix}^{\circ}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-2 \\ 2-3 \\ 1-0 \end{array} $
8783,7539	1000	18,72	20,14	$3p' \begin{bmatrix} 1/_2 \end{bmatrix} - 3d' \begin{bmatrix} 1^{1}/_2 \end{bmatrix}^{\circ}$	
8782,014	50	18,63	20,05	$3p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} - 3d \begin{bmatrix} 2^{1}/_2 \end{bmatrix}^{\circ}$	
8780,6223	1200	18,63	20,05	$3p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} - 3d \begin{bmatrix} 2^{1}/_2 \end{bmatrix}^{\circ}$	
8778,75	150	18,61	20,02	$3p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} - 3d \begin{bmatrix} 1^{1}/_2 \end{bmatrix}^{\circ}$	
8771 ,6592	400	18,72	20,14	$3p' [1/2] - 3d' [11/2]^{\circ}$	1-1
8767 ,55	15	18,61	20,02	$3p [11/2] - 3d [1/2]^{\circ}$	1-1
8714 ,52	5	19,78	21,20	$4s' [1/2]^{\circ} - 7p [1/2]$	1-1
8704 ,1132	200	18,61	20,04	$3p [11/2] - 3d [11/2]^{\circ}$	1-2
8681 ,9216	500	18,61	20,04	$3p [11/2] - 3d [11/2]^{\circ}$	1-1
8679,4898	500	18,71	20,14	$3p \ [1/_2] - 3d' \ [11/_2]^{\circ}$	0-1 $2-2$ $2-3$ $2-2$ $2-1$
8655,5206	400	18,70	20,14	$3p' \ [11/_2] - 3d' \ [21/_2]^{\circ}$	
8654,3837	1500	18,70	20,14	$3p' \ [11/_2] - 3d' \ [21/_2]^{\circ}$	
8647,0400	300	18,70	20,14	$3p' \ [11/_2] - 3d' \ [11/_2]^{\circ}$	
8635,31	50	18,70	20,14	$3p' \ [11/_2] - 3d' \ [11/_2]^{\circ}$	
8634,6472 8591,2583 8582,91 8571,3535 8544,6952	600 400 60 100 60	18,61 18,69 18,69 18,69 18,57	20,05 20,14 20,14 20,14 20,02	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-2 \\ 1-1 \\ 2-1 \end{array} $
8495,3591 8484,4424 8470,72 8463,3569 8418,4265	500 80 5 150 400	18,57 18,57 19,69 18,57 18,57	20,03 20,04 21,15 20,04 20,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 1-2 \\ 2-2 \\ 2-2 \end{array} $
8417,161	100	18,57	20,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3
8377,6062	800	18,55	20,03		3-4
8376,41	200	18,55	20,03		3-3
8365,7464	150	18,55	20,04		3-2
8301,54	150	18,55	20,05		3-2

	λ, Å	I	$E_{ m H}$, eV	E _B . eV	Transition	J
-	8300 ,3248 8267 ,117 8266 ,0788 8259 ,3795 8248 ,6812	600 80 200 150 30	18,55 18,63 18,63 18,63 18,63	20,05 20,14 20,14 20,14 20,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3 2-2 2-3 2-2 2-1
	8136,4061 8128,908 8118,5495 8093,08 8082,4576	300 60 100 2 200	18,61 18,61 18,61 19,69 16,85	20,14 20,14 20,14 21,22 18,38	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 3s' \ [1^{1}/_{2}]^{\circ} - 3p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-1 \\ 1-0 \\ 1-1 \end{array} $
	8076,06 8041,79 8024,11 7944,16 7943,1805	1 2 2 20 200	19,78 19,66 19,66 18,57 18,57	21,31 21,20 21,21 20,14 20,14	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 7p' \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 7p \ [^{21}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 3p \ [^{21}/_{2}] - 3d' \ [^{21}/_{2}]^{\circ} \\ 3p \ [^{21}/_{2}] - 3d' \ [^{21}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 0 \\ 2 - 3 \\ 2 - 2 \\ 2 - 2 \\ 2 - 3 \end{array} $
	7936,9946 7927,1172 7840,04 7839,0550 7833,06	70 40 1 30 7	18,57 18,57 18,55 18,55 18,55	20,14 20,14 20,14 20,14 20,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 2—1 3—2 3—3 3—2
	7724,6281 7670,85 7621,33 7572,06 7544,0439	10 5 5 5 100	18,96 19,69 19,69 — 13,38	20,57 21,30 21,30 — 20,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 0-1 \\ 1-2 \\ 1-0 \\ -1-0 \end{array} $
	7535 ,7739 7488 ,8712 7472 ,4383 7438 ,8981 7325 ,57	300 500 50 300 1 5	18,38 18,38 18,38 16,71 19,78	20,02 20,04 20,04 18,38 21,46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-2 1-1 0-1 1-1,0
	7307,93 7304,82 7245,1665 7173,9380 7138,70	15 30 1000 1000 30	19,66 18,96 16,67 16,85	21,36 20,66 18,38 18,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 0—1 1—1 1—1
	7112,2 7064,42 7059,1079 7051,2937 7032,4128	10 2 200 70 1000	18,96 18,38 18,38 18,38 16,62	20,71 20,14 20,14 20,14 18,38	$\begin{array}{c} 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d' \ [^{2^{1}}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d' \ [^{1^{1}}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d' \ [^{1^{1}}/_{2}]^{\circ} \\ 3s \ [^{1^{1}}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \end{array}$	0-1 $1-2$ $1-2$ $1-1$ $2-1$
_	7024,0500 6929,4672 6759,586 6738,058 6717,0428	500 1000 15 70 70	16,85 16,85 18,72 18,96 16,85	18,61 18,63 20,56 20,80 18,69	$\begin{array}{c} 3s' \ [^{1}/_{2}\]^{\circ} - 3p \ [^{1}/_{2}\] \\ 3s' \ [^{1}/_{2}\]^{\circ} - 3p \ [^{1}/_{2}\] \\ 3p' \ [^{1}/_{2}\] - 5s \ [^{1}/_{2}\]^{\circ} \\ 3p' \ [^{1}/_{2}\] - 4d' \ [^{1}/_{2}\]^{\circ} \\ 3s' \ [^{1}/_{2}\]^{\circ} - 3p' \ [^{1}/_{2}\] \end{array}$	1—1 1—2 1—2 0—1 1—1
	6678 ,2764 6666 ,8967 6652 ,0925 6640 ,80 6640 ,012	500 100 150 5 10	16,85 18,71 16,85 18,70 18,69	18,70 20,57 18,71 20,57 20,56	$\begin{array}{c} 3s' \ [^{1}/_{2}\]^{\circ} - 3p' \ [1^{1}/_{2}\] \\ 3p \ [^{1}/_{2}\] - 5s \ [1^{1}/_{2}\]^{\circ} \\ 3s' \ [^{1}/_{2}\]^{\circ} - 3p \ [^{1}/_{2}\] \\ 3p' \ [1^{1}/_{2}\] - 5s \ [1^{1}/_{2}\]^{\circ} \\ 3p' \ [1^{1}/_{2}\] - 5s \ [1^{1}/_{2}\]^{\circ} \end{array}$	1-2 $0-1$ $1-0$ $2-1$ $1-2$
	6602,907 6598,9529 6532,8824 6506,5279 6444,7118	100 1000 100 100 150	18,69 16,85 16,71 16,67 18,63	20,57 18,72 18,61 18,57 20,56	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [2^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 2 - 2 \end{array} $
	6421 ,7108 6409 ,753 6402 ,2460	100 150 2000	18,72 18,63 16,62	20,66 20,57 18,55	$3p' [1/2] - 5s' [1/2]^{\circ}$ $3p [11/2] - 5s [11/2]^{\circ}$ $3s [11/2]^{\circ} - 3p [21/2]$	$ \begin{array}{r} 1-0 \\ 2-1 \\ 2-3 \end{array} $

λ, Å	I	$E_{_{ m H}},\;{ m eV}$	E _B , eV	Transition	J
6401,076 6382,9914	100 1000	18,72 16,67	20,66 18,61	$3p'$ [$^{1}/_{2}$]— $5s'$ [$^{1}/_{2}$]° $3s$ [$^{1}/_{2}$]° — $3p$ [$^{1}/_{2}$]	1—1 1—1
6365,013 6351,8618 6334,4279 6330,901 6328,1646	100 100 1000 150 300	18,61 18,71 16,62 18,61 18,70	20,56 20,66 18,57 20,57 20,66	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [2^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 3s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-1 \\ 0-1 \\ 2-2 \\ 1-1 \\ 2-1 \end{array} $
6313,6921 6304,7892 6293,7447 6276,039 6273,018	150 100 100 50 70	18,69 16,67 18,69 18,72 18,72	20,66 18,63 20,66 20,70 20,70	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [1^{1}/_{2}] \\ 3p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \end{array}$	1-0 1-2 1-1 1-0 1-1
6266,4950 6258,796 6252,732 6249,593 6246,7294	1000 100 2 5 100	16,71 18,72 18,72 18,96 18,57	18,69 20,71 20,71 20,95 20,56	$\begin{array}{c} 3s' \ [^{1}/_{2}\]^{\circ} - 3p' \ [^{1}/_{2}\] \\ 3p' \ [^{1}/_{2}\] - 4d \ [^{1}/_{2}\]^{\circ} \\ 3p' \ [^{1}/_{2}\] - 4d \ [^{1}/_{2}\]^{\circ} \\ 3p' \ [^{1}/_{2}\] - 6s \ [^{1}/_{2}\]^{\circ} \\ 3p \ [^{2}/_{2}\] - 5s \ [^{1}/_{2}\]^{\circ} \end{array}$	0-1 1-2 1-1 0-1 2-2
6225,742 6217,2813 6213,8758 6205,7775 6202,981	50 1000 150 100 15	18,71 16,62 18,57 18,71 18,70	20,70 18,61 20,57 20,71 20,70	$\begin{array}{c} 3p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3s \ [^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3p \ [^{2}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-1$ $2-1$ $0-1$ $2-1$
6193,0663 6189,0649 6183,169 6182,1460 6175,291	50 70 5 150 50	18,70 18,70 18,70 18,55 18,70	20,70 20,71 20,71 20,56 20,71	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \end{array}$	2-3 2-2 2-1 3-2 2-2
6174,8829 6172,821 6163,5939 6156,145 6150,303	70 15 1000 50 100	18,70 18,69 16,71 18,69 18,69	20,71 20,70 18,72 20,71 20,71	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p' \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 0 \\ 0 - 1 \\ 1 - 2 \\ 1 - 1 \end{array} $
6143,0623 6142,508 6128,4598 6118,027 6096,1630	1000 100 100 15 300	16,62 18,69 16,67 18,63 16,67	18,63 20,71 18,69 20,66 18,70	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [1^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 5s' \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 1-1 \\ 2-1 \\ 1-2 \end{array} $
6074,3377 6064,5359 6046,1348 6042,013 6029,9971	1000 50 50 15 1000	16,67 18,61 18,61 18,96 16,67	18,71 20,66 20,66 21,02 18,72	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \end{array}$	1-0 1-0 1-1 0-1 1-1
6000,9275 5991,6532 5987,9074 5982,401 5975,5340	100 75 150 8 600	18,63 18,63 18,63 18,63 16,62	20,70 20,70 20,71 20,71 18,69	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 2-1 \\ 2-1 \end{array} $
5974,6273 5966,471 5965,4710 5961,6228 5944,8342	500) 35 500 70 500)	18,63 18,72 18,72 18,72 16,62	20,71 20,80 20,80 20,80 18,70	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \end{array}$	2-3 1-2 1-2 1-1 2-2
5939,319 5934,458 5933,958 5922,709 5919,037	50 75 8 25 8	18,57 18,61 — 18,61 18,61	20,66 20,70 	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-1 \\ 1-0 \\ -1 \\ 1-3 \\ 1-2 \end{array} $
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λ, Å	I	$E_{ m H}^{},~{ m eV}$	$E_{_{f B}}$. eV	Transition	J
5918,9068 5913,6327 5906,4294 5902,783 5902,4623	250 250 50 5 50	18,71 18,61 18,61 18,70 18,70	20,80 20,71 20,71 20,80 20,80	$\begin{array}{c} 3p \ [^{1}/_{2}] - 4d' \ [4^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 4d' \ [4^{1}/_{2}]^{\circ} \\ 3p \ [4^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [4^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [4^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \end{array}$	0-1 1-1 1-2 2-2 2-3
5902,097 5898,406 5881,8950 5872,8275 5872,149	3 20 1000 500 75	18,70 18,70 16,62 18,69 18,69	20,80 20,80 18,72 20,80 20,80	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p' \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 2-1 \\ 1-2 \\ 1-2 \end{array} $
5870,971 5868,4183 5852,4878 5828,910 5820,1558	$ \begin{array}{r} 3 \\ 75 \\ 2000 \\ \hline 75 \\ 500 \\ \end{array} $	18,69 16,85 18,57 18,57	20,80 18,96 20,70 20,70	$\begin{array}{c} - \\ 3p' \left[1^{1}/_{2} \right] - 4d' \left[1^{1}/_{2} \right]^{\circ} \\ 3s' \left[{}^{1}/_{2} \right]^{\circ} - 3p' \left[{}^{1}/_{2} \right] \\ 3p \left[2^{1}/_{2} \right] - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 3p \left[2^{1}/_{2} \right] - 4d \left[3^{1}/_{2} \right]^{\circ} \end{array}$	1-1 1-0 2-1 2-3
5816,645 5812,400 5811,4066 5804,4496 5804,098	50 15 300 500 75	18,57 	20,71 20,71 20,71 20,71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 ——————————————————————————————————
5770,307 5764,4188 5764,063 5760,5885 5748,650	50 700 3 70 70	18,96 18,55 18,55 18,55 18,55	21,11 20,70 20,70 20,71 20,71	$\begin{array}{c} 3p' \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{?} \\ 3p \ [^{21}/_{2}] - 4d \ [^{31}/_{2}]^{\circ} \\ 3p \ [^{21}/_{2}] - 4d \ [^{31}/_{2}]^{\circ} \\ 3p \ [^{21}/_{2}] - 4d \ [^{11}/_{2}]^{\circ} \\ 3p \ [^{21}/_{2}] - 4d \ [^{21}/_{2}]^{\circ} \end{array}$	0-1 3-4 3-3 3-2 3-2
5748,2985 5719,532 5719,2248 5718,899 5715,339	500 75 500 150 35	18,55 18,63 18,63 18,63 18,63	20,71 20,80 20,80 20,80 20,80	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{c} \\ 3p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{c} \\ 3p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{c} \\ 3p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{c} \\ 3p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{c} \end{array}$	3-3 2-2 2-3 2-2 2-1
5689,8163 5684,647 5662,5489 5656,6588 5656,030	150 25 75 500 75	18,38 18,96 18,38 18,61 18,61	20,56 21,14 20,56 20,80 20,80	$\begin{array}{c} 3p \ [^{1}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d' \ [^{2}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \end{array}$	1-2 0-1 1-1 1-2 1-2
5652,5664 5591,15 5589,378 5585,905 5576,049	75 8 50 5 35	18,61 18,96 18,72 18,96 18,72	20,80 21,18 20,94 21,18 20,95	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{2} \\ 3p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{o} \\ 3p' \ [^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{o} \\ 3p' \ [^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{o} \\ 3p' \ [^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{o} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 0 - 1 \\ 1 - 1 \end{array} $
5563,047 5562,7662 5562,441 5559,087 5538,651	75 500 150 35 50	18,57 18,57 18,57 18,57 18,71	20,80 20,80 20,80 20,80 20,95	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 2-3 2-2 2-1 0-1
5533,6788 5520,63 5511,485 5511,176 5507,339	75 3 15 3 25	18,70 18,70 18,55 18,55 18,69	20,94 20,95 20,80 20,80 20,94	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-4 \\ 3-3 \\ 3-2 \\ 4-2 \end{array} $
5494,4158 5448,5091 5447,120 5433,6513 5420,155	150 8	18,69 18,38 18,96 18,38 18,72	20,95 20,66 21,24 20,66 21,01	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	1-1 1-0 0-1 1-1 1-0
5418,5584 5412,649 5410,12	150 250 5	18,72 18,72 18,72	21,01 21,02 21,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 1 \end{array} $

λ, Å	I	$E_{ m H},{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
5400,5616 5383,250	2000 25	16,67 18,71	18,96 21,01	$3s [1^{1}/_{2}]^{\circ} - 3p' [1/_{2}]$ $3p [1/_{2}] - 5d [1/_{2}]^{\circ}$	1—0 0—1
5374,9774 5372,3110 5366,222 5362,248 5360,442	50 75 25 25 35	18,71 18,63 18,70 18,70 18,70	21,02 20,94 21,01 21,01 21,02	$\begin{array}{c} 3p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d \ [^{3}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-2$ $2-1$ $2-3$ $2-2$
5360,0121 5358,020 5355,422 5355,176 5353,513	150 10 150 150 5	18,63 18,70 18,70 18,70 18,96	20,95 21,02 21,02 21,02 21,28	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \end{array}$	2-1 2-1 2-2 2-3 0-1
5349,204 5343,2834 5342,700 5341,0938 5335,710	150 600 1 1000 10	18,72 18,38 18,96 18,38 18,69	21,04 20,70 21,28 20,70 21,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-0 1-1 1-1 1-2
5333,323 5330,7775 5326,3968 5320,550 5316,806	50 600 75 2 25	18,69 18,38 18,38 18,38 18,61	21,02 20,71 20,71 20,71 20,94	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-1 \\ 1-2 \\ 1-1 \\ 1-2 \\ 1-2 \end{array} $
5314,781 5304,7580 5298,1891 5280,0853 5274,0393	30 70 150 50 40	18,71 18,61 18,70 18,69 18,69	21,04 20,95 21,04 21,04 21,04	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 1-1 2-1 1-0 1-1
5234,0271 5222,3517 5214,339 5210,5672 5208,8648	50 50 35 50 70	18,57 18,57 18,63 18,63 18,63	20,94 20,95 21,01 21,01 21,02	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	2—2 2—1 2—1 2—3 2—2
5206,565 5203,8962 5193,2227 5193,1302 5191,322	3 150 150 150 35	18,63 18,63 18,72 18,72 18,72	21,02 21,02 21,11 21,11 21,11	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \end{array}$	2-1 2-3 1-2 1-2 3-2
5188,6122 5182,320 5163,474 5158,902 5156,667	150 2 10 50 50	18,55 18,96 18,61 18,71 18,61	20,94 21,36 20,01 21,11 21,02	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	3-2 $ 0-1 $ $ 1-0 $ $ 0-1 $ $ 1-2$
5154,4271 5151,9610 5150,077 5145,122 5145,011	50 75 35 35 500	18,61 18,61 18,63 18,70 18,70	21,02 21,02 20,04 21,11 21,11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 1—2 2—1 2—2 2—2
5144,9384 5143,2665 5128,280 5122,337 5122,257	500 5 2 150 150	18,70 18,70 18,72 18,69 18,69	21,11 21,11 21,14 21,11 21,11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2 - 3 \\ 2 - 1 \\ 1 - 2 \\ 1 - 2 \\ 1 - 2 \end{array} $
5121,866 5120,506 5117,011 5116,5032 5113,6724	2 25 35 150 75	18,72 18,69 18,38 18,38 18,38	21,14 21,11 20,80 20,80 20,80	$\begin{array}{c} 3p' \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d' \ [^{2}1/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 1 - 2 \\ 1 - 2 \\ 1 - 1 \end{array} $
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λ, Å	I	E _H . eV	E _B , eV	Transition	J
5104,701 5099,042 5090,321 5083,968 5081,360	35 25 8 25 15	18,61 18,61 18,71 18,57 18,70	21,04 21,04 21,14 21,01 21,14	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	1-0 1-1 0-1 2-1 2-2
5080,3852 5078,762 5076,581 5074,201 5074,062	150 15 35 35 3	18,57 18,57 18,57 18,57 18,57 18,57	21,14 21,01 21,01 21,01 21,02 21,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 2—3 2—2 2—1 2—2 2—3
5059,150 5052,930 5046,608 5045,816 5042,853	2 25 3 15 15	18,69 18,69 18,72 18,72 18,72	21 ,14 21 ,14 21 ,18 21 ,18 21 ,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-0 \\ 1-1 \\ 1-2 \end{array} $
5041,598 5037,7512 5037,577 5035,989 5031,483	$\begin{array}{c} 1 \\ 500 \\ 3 \\ 35 \\ 2 \end{array}$	18,72 18,55 18,55 18,55 18,55	21 ,18 21 ,01 21 ,01 21 ,02 21 ,02	$\begin{array}{c} 3p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 5d \ [^{3}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 5d \ [^{3}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 5d \ [^{4}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 5d \ [^{4}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \end{array}$	1—1 3—4 3—3 3—2 3—2
5031,3504 5022,870 5015,187 5011,003 5005,333	250 25 5 25 50	18,55 18,57 18,71 18,71 18,63	21,02 21,04 21,18 21,18 21,11	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3 - 3 \\ 2 - 1 \\ 0 - 1 \\ 0 - 1 \\ 2 - 2 \end{array} $
5005,1587 5003,561 5000,395 4998,502 4997,482	500 2 3 10 15	18,63 18,63 18,70 18,70 18,70	21 ,11 21 ,11 21 ,18 21 ,18 21 ,18	$3p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ}$ $3p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ}$ $3p' \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ}$ $3p' \ [1^{1}/_{2}] - 6d \ [3^{1}/_{2}]^{\circ}$ $3p' \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 2 - 1 \\ 2 - 1 \\ 2 - 3 \\ 2 - 2 \end{array} $
4996,209 4994,930 4979,625 4975,961 4974,760	$\begin{array}{c} 2 \\ 150 \\ 5 \\ 10 \\ 50 \end{array}$	18,70 18,70 18,69 18,69 18,69	21,18 21,18 21,18 21,18 21,18	$3p' [1^{1}/_{2}]-6d [1^{1}/_{2}]^{c}$ $3p' [1^{1}/_{2}]-6d [2^{1}/_{2}]^{o}$ $3p' [1^{1}/_{2}]-6d [1^{1}/_{2}]^{o}$ $3p' [1^{1}/_{2}]-6d [1^{1}/_{2}]^{c}$ $3p' [1^{1}/_{2}]-6d [1^{1}/_{2}]^{o}$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 1-0 \\ 1-2 \\ 1-1 \end{array} $
4973,538 4957,122 4957,0335 4955,382 4944,9899	150	18,69 18,61 18,61 18,61 18,63	21,18 21,11 21,11 21,11 21,14	3p' [1 ¹ / ₂]-6d [2 ¹ / ₂]° 3p [1 ¹ / ₂]-5d' [2 ¹ / ₂]° 3p [1 ¹ / ₂]-5d' [1 ¹ / ₂]° 3p [1 ¹ / ₂]-5d' [1 ¹ / ₂]° 3p [1 ¹ / ₂]-7s [1 ¹ / ₂]°	1-2 $1-2$ $1-2$ $1-1$ $2-2$
4939,0457 4930,944 4928,235 4899,013 4897,924		18,63 18,72 18,72 18,71 18,61	21,14 21,24 21,24 21,24 21,14	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7s' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7s' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 7s' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	2—1 1—0 1—1 0—1 1—2
4892,228 4892,1007 4888,365 4885,084 4884,9170	5 100	18,72 18,61 18,72 18,57 { 18,70 18,57	21,26 21,14 21,26 21,11 21,24	$3p' [1/2] - 8s [1^1/2]^{\circ}$ $3p [1^1/2] - 7s [1^1/2]^{\circ}$ $3p' [1/2] - 8s [1^1/2]^{\circ}$ $3p [2^1/2] - 5d' [2^1/2]^{\circ}$ $3p' [1^1/2] - 7s' [1/2]^{\circ}$ $3p [2^1/2] - 5d' [2^1/2]^{\circ}$	1-2 1-1 1-1 2-2 2-1 2-3
4883,403 4868,268 4867,010 4866,476 4865,501	15 70 70 80 100	18,57 18,63 18,69 18,63 18,63	21,11 21,11 21,18 21,24 21,18 21,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1 2-1 1-0 2-3 2-2
4864,351 4863,0800	30	18,69 18,63	21,18 21,24 21,18	$3p [1^{1}/2] - 3a [1^{1}/2]$ $3p [1^{1}/2] - 7s' [1/2]$ ° $3p [1^{1}/2] - 6d [2^{1}/2]$ °	1-1 2-3

λ, Å	I	$E_{ m H}^{}$, eV	E _B . eV	Transition	J
4859,604 4852,6571 4851,501	15 100 60	18,71 18,72 18,72	21 ,26 21 ,28 21 ,28	$3p [1/2] - 8s [11/2]^{\circ}$ $3p' [1/2] - 6d' [21/2]^{\circ}$ $3p' [1/2] - 6d [11/2]^{\circ}$	0—1 1—2 1—1
4849,530 4845,767 4845,145 4842,941 4842,566	30 5 15 50 10	18,70 18,72 18,72 18,72 18,72	21,26 21,28 21,28 21,28 21,28	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 1-0 1-1 1-2 1-1
4837,3139 4829,288 4827,587 4827,3444 4825,529	500 5 300 1000 50	18,38 18,69 18,57 18,38 18,69	20,94 21,26 21,14 21,95 21,26	$\begin{array}{c} 3p \ [^{1}/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{2}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-2 \\ 1-1 \\ 1-1 \end{array} $
4823,370 4823,174 4821,9236 4819,937 4818,789	50 100 300 70 150	18,61 18,71 18,57 18,61 18,61	21,18 21,28 21,14 21,18 21,18	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-0 \\ 0-1 \\ 2-1 \\ 1-2 \\ 1-1 \end{array} $
4817,6386 4816,900 4814,338 4810,634 4810,0640	300 1 50 100 150	18,61 18,71 18,71 18,70 18,70	21,18 21,28 21,28 21,28 21,28	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \end{array}$	1-2 0-1 0-1 2-2 2-3
4809,500 4803,225 4802,363 4801,076 4800,111	10 1 10 2 15	18,70 18,70 18,70 18,70 18,70	21,28 21,28 21,28 21,28 21,28 21,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 2—1 2—3 2—2 2—3
4790 ,728 4790 ,218 4789 ,600 4788 ,9270 4784 ,022	30 500 100 1000 2	18,69 18,69 18,69 18,55 18,69	21,28 21,28 21,28 21,14 21,28	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-1 \\ 3-2 \\ 1-0 \end{array} $
4781,239 4780,884 4780,338 4758,728 4754,440	2 30 300 150 100	18,69 18,69 18,69 18,63 18,57	21,28 21,28 21,29 21,24 21,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 1-1 1-2 2-1 2-1
4753,123 4752,7320 4751,802 4750,686 4749,5754	1 500 30 30 300	18,72 18,57 18,57 18,57 18,57	21,33 21,18 21,18 21,18 21,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 $2-3$ $2-2$ $2-1$ $2-2$
4725,145 4724,162 4723,840 4722,714 4722,150	70 5 70 15 5	18,63 18,72 18,71 18,72 18,72 18,72	24,26 21,35 21,33 21,35 21,35 21,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2 1-0 0-1 1-1 1-2 1-1
4721,536 4717,608 4715,3466 4715,246 4715,132	70 70 1500 30 30	18,63 18,61 18,55 18,55 18,61	21,26 21,24 21,18 21,18 21,24	$\begin{array}{c} 3p \ [1^{1}/2] - 8s \ [1^{1}/2] \\ 3p \ [1^{1}/2] - 7s' \ [^{1}/2] \\ 3p \ [2^{1}/2] - 6d \ [3^{1}/2]^{\circ} \\ 3p \ [2^{1}/2] - 6d \ [3^{1}/2]^{\circ} \\ 3p \ [1^{1}/2] - 7s' \ [^{1}/2]^{\circ} \end{array}$	2-1 1-0 3-4 3-3 1-1
4714,336 4712,800 4712,135 4712,066 4710,478	70 10 15 1000 30	18,55 18,70 18,72 18,55 18,72	21,18 21,33 21,36 21,18 21,36	$\begin{array}{c} 3p \left[2^{1}/_{2} \right] - 6d \left[\left\{ \frac{1}{2} \right\} \right]^{\circ} \\ 3p \left[\frac{1}{1}/_{2} \right] - 9s \left[\frac{1}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 8s' \left[\frac{1}{2} \right]^{\circ} \\ 3p \left[\frac{2^{1}}{2} \right] - 6d \left[\frac{2^{1}}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 8s' \left[\frac{1}{2} \right]^{\circ} \end{array}$	3-2 $ 2-2 $ $ 1-0 $ $ 3-3 $ $ 1-1$
900					

λ, Λ	I	E _H . eV	E _B , eV	Transition	.1
4710,0669 4708,8619 4704,3949 4702,526 4700,469	1000 1200 1500 150 5	18,38 18,38 18,38 18,38 18,38	21,01 21,01 21,02 21,02 21,02	$\begin{array}{c} 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 1/2 \end{bmatrix} \\ 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 1/2 \end{bmatrix} \\ 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 11/2 \end{bmatrix} \\ 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 11/2 \end{bmatrix} \\ 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 11/2 \end{bmatrix} \\ 3p \begin{bmatrix} 1/2 \end{bmatrix} - 5d \begin{bmatrix} 21/2 \end{bmatrix} \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
4696,943 4695,363 4691,580 4688,191 4687,6724	5 20 15 2 100	18,71 18,71 18,69 18,63 18,63	21,35 21,35 21,33 21,28 21,28	$\begin{array}{c} 3p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{z} \\ 3p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{z} \\ 3p' \ [^{1}/_{2}] - 9s \ [^{1}/_{2}]^{z} \\ 3p \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}]^{z} \\ 3p \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}] \end{array}$	0-1 0-1 1-1 2-2 2-3
4683,764 4683,238 4682,910 4682,146 4681,930	30 5 40 20 20	18,71 18,70 18,70 18,61 18,70	21,36 21,35 21,35 21,26 21,35	$\begin{array}{c} 3p \left[\frac{1}{2} \right] - 8s' \left[\frac{1}{2} \right] \\ 3p' \left[\frac{1}{2} \right] - 8d \left[\frac{3}{2} \right] \\ 3p' \left[\frac{4}{2} \right] - 8d \left[\frac{1}{2} \right] \\ 3p \left[\frac{1}{2} \right] - 8s \left[\frac{1}{2} \right] \\ 3p' \left[\frac{1}{2} \right] - 8d \left[\frac{2}{2} \right] \end{array}$	0-1 2-3 2-2 1-2 2-3
4681,200 4680,363 4679,135 4678,604 4678,218	50 100 150 50 300	18,63 18,63 18,63 18,61 18,63	21,28 21,28 21,28 21,26 21,29	$\begin{array}{c} 3p \left[\frac{1}{2} \right] - 7d \left[\frac{1}{2} \right] ^{\circ} \\ 3p \left[\frac{1}{2} \right] - 7d \left[\frac{3}{2} \right] \\ 3p \left[\frac{4}{2} \right] - 7d \left[\frac{1}{2} \right] \\ 3p \left[\frac{1}{2} \right] - 8s \left[\frac{1}{2} \right] \\ 3p \left[\frac{1}{2} \right] - 7d \left[\frac{2}{2} \right] \\ \end{array}$	2-1 2-3 2-2 1-1 2-3
4670,884 4667,350 4666,654 4663,518 4663,092	70 100 50 20 40	18,70 18,72 18,72 (18,72 (18,69 18,69	21,36 21,38 21,38 21,35 21,35 21,35	$\begin{array}{c} 3p' \left[\frac{1}{2} \right] - 8s \left[\frac{1}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 7d' \left[\frac{2^{1}}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 7d' \left[\frac{1^{1}}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 10s \left[\frac{1}{2} \right]^{\circ} \\ 3p' \left[\frac{1}{2} \right] - 8d \left[\frac{1^{1}}{2} \right]^{\circ} \\ 3p' \left[\frac{1^{1}}{2} \right] - 8d \left[\frac{2^{1}}{2} \right]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 1 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
4661,1054 4656,3936 4653,699 4652,101 4649,904		18,38 18,38 18,69 18,69 18,57	21,04 21,04 21,36 21,36 21,24	$\begin{array}{c} 3p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}] \\ 3p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}] \\ 3p \ [^{2}/_{2}] - 7s' \ [^{1}/_{2}] \\ \end{array}$	1-0 1-1 1-0 1-1 2-1
4645 ,885 4645 ,4186 4644 ,833 4643 ,931 4643 ,182	1 300 40 2 5	18,61 18,61 18,61 18,72 18,72	21,28 21,28 21,28 21,39 21,39	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \end{array}$	1-2 1-2 1-1 1-1 1-2
4640 ,443 4639 ,591 4636 ,974 4636 ,634 4636 ,125	70 30 50 70 70	18,71 18,61 18,61 18,61 18,61	21,38 21,28 21,28 21,28 21,29	$\begin{array}{c} 3p \ [^{1}/_{2}] - 7d' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 7d \ [^{2}/_{2}]^{\circ} \end{array}$	0-1 $1-0$ $1-2$ $1-1$ $1-2$
4628,460 4628,311 4627,799 4617,837 4616,911		18,70 18,70 18,70 18,57 18,71	21,38 21,38 21,38 21,26 21,39	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 2-2, \ 3 \\ 2-1 \\ 2-2 \\ 0-1 \end{array} $
4614,391 4609,910 4609,365 4604,938 4604,680	$\frac{30}{5}$	18,57 18,69 18,69 18,69 18,70	21,26 21,38 21,38 21,38 21,39	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 1-1 \\ 2-2 \end{array} $
4604,095 4595,249 4593,243 4586,145 4585,876	50 50 2	18,70 18,63 18,63 18,69 18,69	21,40 21,33 21,33 21,39 21,40	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-3 \\ 2-2 \\ 2-4 \\ 1-4 \\ 1-2 \end{array} $
4582,980 4582,556		18,72 18,57	21 ,43 21 ,28	$3p' [1/2] - 9s' [1/2]^{\circ}$ $3p [2^{1}/2] - 6d' [2^{1}/2]^{\circ}$	1—0 2—2

λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
4582,4521 4582,105 4582,035	150 15 150	18,55 18,57 18,57	21 ,26 21 ,28 21 ,28	$3p [2^{1}/_{2}]$ —8s $[1^{1}/_{2}]^{\circ}$ $3p [2^{1}/_{2}]$ —6d' $[1^{1}/_{2}]^{\circ}$ $3p [2^{1}/_{2}]$ —6d' $[2^{1}/_{2}]^{\circ}$	3—2 2—2 2—3
4575,858 4575,0620 4573,759 4573,557 4573,066	20 300 30 50 5	18,57 18,57 18,57 18,57 18,57	21 ,28 21 ,28 21 ,28 21 ,28 21 ,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 2-1 \\ 2-2 \end{array} $
4567,845 4567,139 4566,830 4565,888 4556,698	10 15 40 60 2	18,63 18,63 18,63 18,63 18,71	21,35 21,35 21,35 21,35 21,43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 2-3 \\ 0-1 \end{array} $
4555,392 4554,824 4554,561 4554,415 4552,598	30 40 5 10 30	18,63 18,72 18,61 18,72 18,61	21,36 21,45 21,33 21,45 21,33	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 8d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 8d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-1 1-2 1-2 1-1 1-1
4550,640 4547,728 4547,218 4545,729 4544,502	1 15 10 1 50	18,70 18,55 18,55 18,69 18,70	21,43 21,28 21,28 21,42 21,43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-3 \\ 3-2 \\ 3-3 \\ 1-1 \\ 2-1 \end{array} $
4540 ,380 4539 ,168 4538 ,293 4537 ,7545 4537 ,683	50 50 300 1000 300	18,55 18,55 18,55 18,38 18,38	21 ,28 21 ,28 21 ,29 21 ,11 21 ,11	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 $ 3-2 $ $ 3-3 $ $ 1-2 $ $ 1-2$
4536, 312 4532, 395 4529, 476 4527, 973 4527, 725	150 1 30 1 15	18,38 18,69 18,71 18,61 18,69	21 ,11 21 ,43 21 ,45 21 ,35 21 ,43	$\begin{array}{c} 3p \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 8d' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \end{array}$	1—1 1—1 0—1 1—0 1—0
4526,685 4526,177 4525,764 4517,736 4516,936	15 50 70 100 50	{ 18,69 18,61 18,61 18,61 18,70 18,61	21,43 21,35 21,35 21,35 21,45 21,45	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 8d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \end{array}$	1-1 1-2 1-1 1-2 2-3 1-0
4515,411 4515,022 4514,891 4511,509 4510,170	30 2 70 20 15	18,61 18,63 18,63 18,63 18,63	21,36 21,38 21,38 21,38 21,38	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 2 - 3 \\ 2 - 2 \\ 2 - 1 \end{array} $
4500,182 4499,843 4499,000 4493,699 4493,108	50 5 2 50 5	18,69 { 18,69 18,72 18,72 18,57 18,63	21,45 21,45 21,48 21,48 21,33 21,39	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 8d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 8d' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 10s' \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 10s' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-0 \\ 1-1 \\ 2-2 \\ 2-1 \end{array} $
4492,689 4492,412 4492,132 4491,838 4491,771	15 30 5 50 80	18,63 18,63 18,63 18,63 18,57	21,39 21,39 21,39 21,40 21,33	$\begin{array}{c} 3p \ [4^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 3p \ [4^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 3p \ [4^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 3p \ [4^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 9s \ [4^{1}/_{2}]^{\circ} \end{array}$	2-3 2-2 2-1 2-2, 3 2-1
4488,0926 4483,190 4480,823	300 150 15	18,38 18,38 18,72	21 ,14 21 ,14 21 ,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—1 1—2

λ, Å	ı	E _H , eV	$E_{_{ m B}},{ m eV}$	Transition	J
4475 ,656 4475 ,131	100 5	18,61 18,61	21 ,38 21 ,38	$3p \ [1^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ}$ $3p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 1-2 \\ 1-1 \end{array} $
4472,246 4470,971 4467,491 4466,8120 4466,503	1 5 1 70 2	18,61 18,61 18,57 18,57 18,57	21,38 21,38 21,35 21,35 21,35	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{c} \\ 3p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{c} \\ 3p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{c} \\ 3p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{c} \\ 3p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{c} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-1 \\ 2-3 \\ 2-2 \end{array} $
4466,045 4465,651 4462,856 4460,175 4456,380	50 2 100 1	18,57 18,57 18,70 18,55 18,71	21,35 21,35 21,48 21,33 21,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-1 \\ 3-2 \\ 0-1 \end{array} $
4455,564 4454,285 4453,528 4453,324 4453,253	15 5 1 2 5	18,57 18,63 18,61 18,63 18,61	21,36 21,42 21,39 21,42 21,39	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-2 \\ 2-1 \\ 1-1 \end{array} $
4452,983 4446,538 4445,671 4444,978 4440,890	15 1 1 30 1	18,61 18,69 18,69 18,70 18,63	21,40 21,48 21,48 21,49 21,43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 1-0 \\ 1-1 \\ 2-2 \\ 2-3 \end{array} $
4440,812 4440,363 4435,094 4433,7239 4433,398	2 15 5 70 10	18,63 18,63 18,63 18,55 18,55	21,43 21,43 21,43 21,35 21,35	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 2-3 2-1 3-4 3-2
4432,526 4429,410 4427,981 4427,755 4425,400	20 1 15 30 150	18,55 18,72 18,69 18,69 18,38	21,35 21,52 21,49 21,49 21,18	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 10d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d' \ [2^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 9d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 3-3 \\ 1-2 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
4424,8096 4422,5205 4421,559 4420,558 4416,817	300 300 50 1 50	18,38 18,38 18,38 18,38 18,57	21 ,18 21 ,18 21 ,18 21 ,18 21 ,38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 1—2 1—1 1—2 2—3
4415,141 4413,561 4412,285 4409,620 4405,582	5 15 20 20 2	18,61 18,57 18,57 18,63 18,71	21,42 21,38 21,38 21,45 21,52	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10d' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 2 - 1 \\ 2 - 3 \\ 0 - 1 \end{array} $
4402,985 4402,580 4402,374 4398,136 4397,175	1 1 2 5 1	18,63 18,61 18,61 18,61 18,61	21,45 21,43 21,43 21,43 21,43	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \end{array}$	2-3 1-1 1-2 1-0 1-1
4395,969 4395,556 4395,306 4395,008 4394,773	1 50 1 1 15	18,57 18,57 18,57 18,57 18,57	21,39 21,39 21,39 21,39 21,40	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 2-1 \\ 2-2 \end{array}$
4394,370 4381,220 4377,754 4374,997 4372,157	15 30 2 2 2 30	18,70 18,55 18,69 { 18,63 18,61 18,61	21,52 21,38 21,52 21,47 21,44 21,45	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 10d' \ [2^{1}/_{2}]^{2} \\ 3p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 10d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 12d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8d' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-3, 2 \\ 3-2 \\ 1-2 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $

λ, Å	I	$E_{_{ m H}}$. eV	EB, eV	Transition	J
4371,796	2	18,61	21,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
4365,705	1	18,61	21,45		1-2
4363,524	70	18,55	21,39		3-4
4363,228	2	18,55	21,39		3-2
4362,690	30	18,55	21,40		3-3
4358,816	2	18,57	21,42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2
4357,918	5	18,57	21,42		2-1
4357,298	2	18,63	21,48		2-1
4346,036	15	18,57	21,43		2-3
4345,762	1	18,61	21,46		1-2
4345,479 4340,420 4340,256 4338,200 4336,221	2 2 2 2 50	18,57 18,57 18,63 18,61 18,38	21,43 21,43 21,49 21,47 21,24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-2 \\ 2-1 \\ 2-2 \\ 1-2 \\ 1-0 \end{array}$
4334,1267 4327,265 4321,492 4319,511 4318,834	70 10 2 1 5	18,38 18,55 18,61 18,57 18,57	21,24 21,42 21,48 21,44 21,44	$\begin{array}{c} 3p \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{2^{1}}/_{2}] - 11s \ [^{1^{1}}/_{2}]^{\circ} \\ 3p \ [^{1^{1}}/_{2}] - 10s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{2^{1}}/_{2}] - 12s \ [^{1^{1}}/_{2}]^{\circ} \\ 3p \ [^{2^{1}}/_{2}] - 12s \ [^{1^{1}}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 3 - 2 \\ 1 - 0 \\ 2 - 2 \\ 2 - 1 \end{array} $
4316,008	15	18,57	21;45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3, 2
4314,695	30	18,55	21,43		3-4, 3
4314,110	1	18,55	21,43		3-3
4310,130	2	18,57	21,45		2-3
4306,2625	70	18,38	21,26		1-2
4303,695	5	18,61	21,49	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 9d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 9d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 10d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 13s \ [1^{1}/_{2}]^{\circ} \end{array}$	1-2
4303,695	1	18,61	21,49		1-1
4303,248	30	18,38	21,26		1-1
4291,976	2	18,63	21,52		2-2, 3
4289,799	2	18,57	21,46		2-1
4288,541	5	18,55	21,44	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2
4283,242	10	18,57	21,47		2-3
4279,279	15	18,55	21,45		3-4, 3
4278,850	5	18,55	21,45		3-3, 2
4275,5598	70	18,38	21,28		1-2
4275,167 4274,656 4270,267 4269,724 4268,009	1 50 50 70 70	18,38 18,38 18,38 18,38 18,38	21,28 21,28 21,28 21,28 21,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 1-1 \\ 1-0 \\ 1-1 \\ 1-2 \end{array} $
4267,724	5	18,38	21,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
4267,286	1	18,38	21,29		1-2
4262,479	2	18,57	21,48		2-3
4259,739	1	18,55	21,46		3-2
4256,498	2	18,61	21,52		1-2
4252,775	2	18,55	21,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4
4252,418	2	18,55	21,47		3-3
4249,538	2	18,57	21,49		2-2
4232,323	1	18,55	21,48		3-3
4221,554	1	18,55	21,48		3-3
4203,270 4198,099 4196,415 4175,488 4175,223	2 70 15 40 60	18,57 18,38 18,38 18,38 18,38	21,52 21,33 21,33 21,35 21,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2 - 3 \\ 1 - 2 \\ 1 - 1 \\ 1 - 0 \\ 1 - 1 \end{array} $
4174,369 4173,966 4166,091	70 2 30	18,38 18,38 18,38	21,35 21,35 21,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1 - 2 \\ 1 - 1 \\ 1 - 0 \end{array} $

λ, λ		E _H eV	$E_{ m B}$, eV	Transition	J
4164 ,802 4131 ,054	50 70	18,38 18,38	21,36 21,38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 1—2
4130,512 4128,072 4126,941 4112,885 4112,694	$ \begin{array}{c} 20 \\ 30 \\ 2 \\ 40 \\ 20 \end{array} $	18,38 18,38 18,38 18,38 18,38	21,38 21,38 21,38 21,39 21,39	$\begin{array}{c} 3p \ [^{1}/_{2}] - 7d' \ [4^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 10s \ [4^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 10s \ [4^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \end{array}$	1—1 1—2 1—1 1—0 1—1
4112,100 4111,882 4080,148 4079,359 4069,389	15 1 50 2 5	18,38 18,38 18,38 18,38 18,38	21,39 21,39 21,42 21,42 21,43	$\begin{array}{c} 3p \ [^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 9d \ [4^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 1-2 \\ 1-1 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
4069,243 4068,835 4064,829 4064,036 4045,662	$\begin{array}{c} 30 \\ 30 \\ 15 \\ 50 \\ 2 \end{array}$	18,38 18,38 18,38 18,38 18,38	21,43 21,43 21,43 21,43 21,44	$\begin{array}{c} 3p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{c} \\ 3p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{c} \\ 3p \ [^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{o} \\ 3p \ [^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{o} \\ 3p \ [^{1}/_{2}] - 12s \ [^{1}/_{2}]^{o} \end{array}$	1-1 1-2 1-0 1-1 1-2
4042,642 4042,327 4037,696 4037,615 4037,262	50 10 5 15 5	18,38 18,38 18,38 18,38 18,38	21,45 21,45 21,45 21,45 21,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 1-1 \\ 1-0 \\ 1-1 \\ 1-2, 1 \end{array} $
4020,015 4013,995 4013,752 3999,263 3998,594	2 1 1 1	18,38 18,38 18,38 18,38 18,38	21,46 21,47 21,47 21,48 21,48	$\begin{array}{c} 3p \ [^{1}/_{2}] - 13s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 12s \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 12d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 10s' \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 10s' \ [^{1}/_{2}]^{\circ} \end{array}$	1-2 1-1 1-2 1-0 1-1
3995,721 3984,253 3984,065 3943,540 3899,723	1 7 2 2 2 2	18,38 18,38 18,38 18,38 16,85	21,48 21,49 21,49 21,52 20,02	$\begin{array}{c} 3p \ [^{1}/_{2}] - 13d \ [^{1}/_{2}]^{c} \\ 3p \ [^{1}/_{2}] - 9d' \ [^{2^{1}}/_{2}]^{c} \\ 3p \ [^{1}/_{2}] - 9d' \ [^{1}/_{2}]^{c} \\ 3p \ [^{1}/_{2}] - 10d' \ [^{2^{1}}/_{2}]^{c} \\ 3s' \ [^{1}/_{2}]^{c} - 3d \ [^{1}/_{2}]^{c} \end{array}$	1—1 1—2 1—1 1—2 1—1
3889,427 3887,134 3882,698 3769,654 3769,449	5 1 2 5 7	16,85 46,85 46,85 46,85 46,85	20,03 20,04 20,04 20,14 20,14	$3s' [1/2]^{\circ} - 3d [31/2]^{\circ}$ $3s' [1/2]^{\circ} - 3d [41/2]^{\circ}$ $3s' [1/2]^{\circ} - 3d [41/2]^{\circ}$ $3s' [1/2]^{\circ} - 3d' [21/2]^{\circ}$ $3s' [1/2]^{\circ} - 3d' [21/2]^{\circ}$	$ \begin{array}{r} 1 - 3 \\ 1 - 2 \\ 1 - 4 \\ 1 - 2 \\ 1 - 3 \end{array} $
3768,047 3765,819 3754,2148 3701,2247 3685,7351	5 50 40 100	16,85 16,85 16,85 46,85 16,85	20, 14 $20, 14$ $20, 15$ $20, 20$ $20, 21$	$3s' [1/2]^{\circ} - 3d' [11/2]^{\circ}$ $3s' [1/2]^{\circ} - 3d' [11/2]^{\circ}$ $3s' [1/2]^{\circ} - 4p [1/2]$ $3s' [1/2]^{\circ} - 4p [21/2]$ $3s' [1/2]^{\circ} - 4p [11/2]$	1-2 $1-1$ $1-1$ $1-2$ $1-1$
3682,2421 3633,6643 3609,1787 3600,1694 3593,640	100 100 50 100 300	16,85 16,85 16,71 16,85 16,85	20,21 20,26 20,15 20,29 20,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 0-1 \\ 1-1 \\ 1-1 \end{array} $
3593,5263 3562,9551 3520,4714 3515,1900 3510,7207	500 15 1000 200 50	16,85 16,67 16,85 16,67 16,62	20,30 20,45 20,37 20,20 20,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-0 \\ 1-2 \\ 2-1 \end{array} $
3501,2154 3498,0632 3472,5706 3466,5781 3464,3385	200	16,67 16,67 16,62 16,71 16,62	20,24 20,24 20,19 20,29 20,20	$3s [1^{1}/_{2}]^{\circ} - 4p [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} - 4p [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} - 4p [2^{1}/_{2}]$ $3s' [1/_{2}]^{\circ} - 4p' [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} - 4p [2^{1}/_{2}]$	1-1 1-2 2-3 0-1 2-2

λ, Å	1	E _H , eV	EB, eV	Transition	J
3460 ,5235 3454 ,1942 3450 ,7641 3447 ,7022 3423 ,9120	100 100 50 200 50	16,71 16,67 16,62 16,62 16,67	20,30 20,26 20,21 20,21 20,29	$\begin{array}{c} 3s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 3s \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 3s \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 3s \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 3s \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \end{array}$	0—1 1—0 2—1 2—2 1—1
3418,007 3417,9031 3375,6489 3369,9069 3369,8076	50 50 0 50 7 00 500	16,67 16,67 16,62 16,62 16,62	20,30 20,30 20,29 20,30 20,30	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ}-4p' \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-4p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-4p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-4p' \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-4p' \ [1^{1}/_{2}] \end{array}$	1—1 1—2 2—1 2—1 2—2
3351,744 3167,5762 3153,4107 3148,6107 3147,701	25 50 100 100 25	16,67 16,85 16,85 16,85 16,85	20,37 20,76 20,78 20,78 20,78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 1-1 1-2 1-1 1-2
3126,1986 3079,175 3078,875 3076,971 3063,695	200 100 100 200 200	16,85 16,85 16,85 16,85 16,71	20,81 20,87 20,87 20,88 20,76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 1-1 1-1 1-2 0-1
3057,388 3045,949 3030,313 3017,348 3012,955	300 7 50 50 50	16,85 16,71 16,67 16,67 16,67	20,90 20,78 20,76 20,78 20,78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 0-1 1-1 1-2 1-1
3012,129 2994,250 2992,438 2992,420 2982,663	50 3 200 200 300	16,67 16,67 16,62 16,67 16,62	20,78 20,81 20,76 20,81 20,77	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} -5p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -4f' \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -5p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -5p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -5p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-1 \\ 1-0 \\ 2-3 \end{array} $
2980,922 2980,642 2979,806 2975,518 2974,714	50 40 50 35 300	16,71 16,71 16,52 16,72 16,2	20,87 20,87 20,78 20,78 20,78	$\begin{array}{c} 3s' \ [^{1}/_{2}]^{\circ} - 5p' \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 5p' \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 5p \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \end{array}$	0-1 $0-1$ $2-2$ $2-1$ $2-2$
2957, 293 2952, 527 2949, 316 2949, 043 2947, 297	8 5 15 10 200	16 32 16 ,85 16 ,67 16 ,67 16 ,67	20,81 21,05 20,87 20,87 20,88	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ}-4f' \ [2^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ}-5p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-5p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-5p' \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-5p' \ [1^{1}/_{2}] \end{array}$	2-2, 3 1-1 1-1 1-1 1-2
2946,732 2944,575 2932,721 2929,312 2913,417	$\begin{array}{c} 2 \\ 2 \\ 100 \\ 15 \\ 2 \end{array}$	16,85 16,85 16,85 16,67 16,62	21,05 21,06 21,07 20,90 20,87	$\begin{array}{c} 3s' \ [^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 5p' \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 5p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-0 \\ 1-0 \\ 2-1 \end{array} $
2913,168 2911,461 2881,852 2880,290 2872,663	200 25 2 3 35	16,62 16,62 16,85 16,85 16,85	20,87 20,88 21,15 21,15 21,16	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 5p' \ [1/_{2}] \\ 3s \ [3^{1}/_{2}]^{\circ} - 5p' \ [1/_{2}] \\ 3s' \ [1/_{2}]^{\circ} - 6p' \ [1/_{2}] \\ 3s' \ [1/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 3s' \ [1/_{2}]^{\circ} - 6p' \ [1/_{2}] \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-1 \\ 1-2 \\ 1-0 \end{array} $
2862,070 2846,490 2842,632 2835,233 2832,921	8 2 15 15	16,71 16,85 16,85 16,85 16,67	21,05 21,20 21,21 21,22 21,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 $1-1$ $1-0$ $1-1$
2827,584 2825,609 2825,259	3 8 10	16,67 16,67 16,67	21,05 21,06 21,06	$3s [1^{1/2}]^{\circ}-6p [2^{1/2}]$ $3s [1^{1/2}]^{\circ}-6p [1^{1/2}]$ $3s [1^{1/2}]^{\circ}-6p [1^{1/2}]$	$ \begin{array}{c} 1 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $

λ, Å	I	$E_{\mathbf{H}}$, eV	$E_{ m B}$, eV	Transition	J
2814,685 2799,80	20 2	16,67 16,62	21,07 21,05	3s [1 ¹ / ₂]°-6p [¹ / ₂] 3s [1 ¹ / ₂]°-6p [¹ / ₂]	1-0 2-1
2795,963 2795,613 2795,101 2794,592 2792,660	8 1 35 5 3	16,62 16,71 16,71 16,62 16,62	21,05 21,15 21,15 21,05 21,06	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \end{array}$	2—3 0—1 0—1 2—2 2—1
2792,318 2782,07 2781,68 2775,049 2767,77	20 2 3 5 2	16,62 16,85 16,85 16,85 16,67	21,06 21,30 21,30 21,31 21,15	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 1-2 \\ 1-0 \\ 1-1 \end{array} $
2767,28 2766,364 2762,324 2759,323 2758,64	3 3 3 2 3	16,67 16,67 16,71 16,67 16,71	21,15 21,15 21,20 21,16 21,21	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ}-7p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ}-6p' \ [^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ}-7p \ [1^{1}/_{2}] \end{array}$	1—1 1—2 0—1 1—0 0—1
2755,82 2743,53 2736,177 2735,69 2735,168	15 15 5 8 3	16,62 16,85 16,62 16,62 16,67	21,12 21,36 21,15 21,15 21,20	$\begin{array}{c} 3s \left[1^{1}/_{2}\right]^{\circ} - 5f' \left[2^{1}/_{2}\right] \\ 3s' \left[^{1}/_{2}\right]^{\circ} - 9p \left[^{1}/_{2}\right] \\ 3s \left[^{1}/_{2}\right]^{\circ} - 6p' \left[^{1}/_{2}\right] \\ 3s \left[1^{1}/_{2}\right]^{\circ} - 6p' \left[1^{1}/_{2}\right] \\ 3s \left[1^{1}/_{2}\right]^{\circ} - 7p \left[^{1}/_{2}\right] \end{array}$	2-2, 3 1-0 2-1 2-1 1-1
2734,755 2732,61 2731,528 2731,358 2724,772	2 1 3 3 3	16,62 16,67 16,67 16,67 16,67	21,15 21,21 21,21 21,21 21,22	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [1/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 1-1 \\ 1-2 \\ 1-0 \end{array} $
2704,32 2702,554 2701,766 2701,653 2700,681	2 3 2 2 2	16,62 16,62 16,62 16,71 16,62	21,20 21,20 21,21 21,30 21,21	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 3s \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 0-1 \\ 2-1 \end{array} $
2700,555 2680,685 2679,49 2677,87 2677,020	8 1 2 2 1	16,62 16,85 16,67 16,67 16,67	21,21 21,46 21,29 21,30 21,30	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} -7p \ [1^{1}/_{2}] \\ 3s' \ [1^{1}/_{2}]^{\circ} -9p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -8p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -8p \ [2^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} -8p \ [1^{1}/_{2}] \end{array}$	2-2 1-0 1-1 1-2 1-1
2675,64 2675,24 2669,13 2657,52 2648,56	200 200 3 45 25	16,67 16,67 { 16,67 16,67 16,85 16,62	21,30 21,30 21,30 21,31 21,51 21,30	$3s [1^{1}/_{2}]^{\circ} -7p' [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} -7p' [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} -8p [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} -7p' [1^{1}/_{2}]$ $3s' [1^{1}/_{2}]^{\circ} -10p' [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} -8p [2^{1}/_{2}]$	1—1 1—2 1—0 1—0 1—0 2—3
2648 ,21 2647 ,76 2647 ,42 2646 ,19 2645 ,645	15 8 200 15 35	16,62 16,71 16,62 16,62 16,62	21,30 21,39 21,30 21,30 21,30	$3s [1^{1}/2]^{\circ} -8p [2^{1}/2]$ $3s' [1^{1}/2]^{\circ} -8p' [1^{1}/2]$ $3s [1^{1}/2]^{\circ} -8p [1^{1}/2]$ $3s [1^{1}/2]^{\circ} -7p' [1^{1}/2]$ $3s [1^{1}/2]^{\circ} -7p' [1^{1}/2]$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 2-2, 1 \\ 2-1 \\ 2-2 \end{array} $
2644,16 2642,47 2639,97 2636,070 2622,90	5 8 15 25 15	16,85 16,67 16,67 16,85 16,67	21,53 21,36 21,36 21,55 21,40	$3s' [1/2]^{\circ} - 11p' [1/2]$ $3s [1^{1}/2]^{\circ} - 9p [1^{1}/2]$ $3s [1^{1}/2]^{\circ} - 9p [1/2]$ $3s' [1/2]^{\circ} - 12p' [1/2]$ $3s [1^{1}/2]^{\circ} - 8p' [1^{1}/2]$	1-0 $1-2$, 1 $1-0$ $1-0$ $1-2$, 1
2616,62 2614,26 2613,94 2613,59 2594,56	25 5 2 30 2	16,67 16,62 16,62 16,62 16,62	21,40 21,36 21,36 21,36 21,39	$3s [1^{1}/_{2}]^{\circ}-8p' [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ}-9p [2^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ}-9p [2^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ}-9p [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ}-8p' [1^{1}/_{2}]$	$ \begin{array}{c} 1-0 \\ 2-3 \\ 2-2 \\ 2-2, 1 \\ 2-2, 1 \end{array} $

λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
2591 ,15 2590 ,67 2589 ,48 2574 ,55 2561 ,79	3 10 2 8 8	16,62 16,62 16,67 16,62 16,62	21,40 21,40 21,46 21,43 21,46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-3 \\ 2-2 , 1 \\ 1-2 , 1 \\ 2-2 , 1 \\ 2-2 , 1 \end{array}$
958,86 743,721 735,892 660,04 629,729	1 12 30 2 6	0,00 0,00 - 0,00	16,67 16,85 — 19,69	$\begin{array}{c} - \\ 2p^{6} {}^{1}S - 3s {} {} {} {} {} {} {} {} {} {} {} {} {} $	0—1 0—1 0—1 — 0—1
626,819 619,092 618,668 615,623 602,712	6 4 5 5 4	00,00 00,00 0,00 0,00 0,00	19,78 20,02 20,04 20,14 20,56	$\begin{array}{c} 2p^{6} {}^{1}S - 4s' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5s \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1 0-1 0-1 0-1 0-1
600,04 598,86 598,698 595,911 591,82	2 1 2 3 2	00,00 00,00 00,00 00,00	20,66 20,70 20,71 20,80 20,95	$\begin{array}{c} 2p^{6} {}^{1}S - 5s' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 6s \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1 0-1 0-1 0-1 0-1
589,92 589,16 587,20 586,30 585,25	1 1 1 —	0,00 0,00 0,00 —	21,02 21,04 21,11 —	$2p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 6s' [1/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ}$ $-$	0—1 0—1 0—1 —
582,46 581,14 580,64 580,50 579,75	 	_ _ _ _	_ _ _ _		
5 7 9 ,40 578 ,82	<u> </u>	<u> </u>		_	Ξ

Ne II, ground state $1s^2 \ 2s^2 \ 2p^{5} \ {}^2P^0_{3/2}$ Ionization potential 331350 cm⁻¹; 41,079 eV

λ, Å	I	$E_{\mathbf{H}}^{}$, eV	E_{B} , eV	Transition	J
4922,3	0	35,05	37,56	4s ⁴ P-4f ⁴ D°	1/2-1/2
4869,8	0	35,01	37,55	$4s \stackrel{4}{P} - 4f \stackrel{4}{P} \stackrel{\circ}{}$	$\frac{3}{2} - \frac{3}{2}$
4849,4 4795,62	$egin{array}{c} 0 \ 2 \end{array}$	$35,01 \\ 34,96$	$37,56 \\ 37,55$	4s ⁴ P-4f ⁴ D° 4s ⁴ P-4f ⁴ D°	$\frac{3}{5}/2 - \frac{1}{5}/2$
4781,95 4781,95	1	34,96	37,55 37,55	$4s ^4P - 4f ^4D^{\circ}$	$\frac{5}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{3}{2}$
4732,53	1	34,93	37,55	$3d^{2}P-4f^{4}D^{\circ}$	3/2-5/2
4730 ,24	0,5	35,01	37,63	$4s ^4P - 4f ^4F^{\circ}$	$^{3}/_{2}^{-}$ $^{-3}/_{2}^{-}$
4719 ,37	1,5	34,93	37,55	$3d^{2}P-4f^{4}D^{\circ}$	$3/_{2}^{-}$ $-3/_{2}^{-}$
4710,04	2	35,01	37,64	4s ⁴ P—4f ⁴ G°	$^{3}/_{2}$ — $^{5}/_{2}$
4701,2	0	-	_	_	
4700,1	0	34,9 3	37,56	$3d~^2P$ — $4f~^4D^\circ$	$^{3}/_{2}$ — $^{1}/_{2}$
4647,34	0,5	34,96	37,63	$4s ^4P - 4f ^4F^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$
4634 ,73	$\frac{2}{3}$	3 4,8 8	37,55	$3d^{2}P$ — $4f^{4}D^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
85, 4627	3	34,96	37,64	$4s ^4P - 4f ^4G^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$
4615,98	4	34,88 34,86	37,56 3 7, 54	$\frac{3d}{3}\frac{^{2}P-4f}{^{4}D^{\circ}}$ $\frac{3d}{^{4}P-4f}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

					
λ, Å	I	$E_{ m H}^{}.$ eV	E _B , eV	Transition	J
4612,89 4600,11 4588,13 4580,35 4574,49	1 1 3 3	34,86 34,86 34,93 34,96 34,84	37,55 37,55 37,63 37,67 37,55	$3d^{4}P - 4f^{4}D^{\circ}$ $3d^{4}P - 4f^{4}D^{\circ}$ $3d^{2}P - 4f^{4}F^{\circ}$ $4s^{4}P - 4f^{4}F^{\circ}$ $3d^{4}P - 4f^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4569,01 4565,49 4562,05 4553,16 4544,11	5 1 1 4 1	34,93 34,83 34,84 34,83 34,84	37,64 37,55 37,55 37,55 37,56	$3d^{2}P-4f^{4}G^{\circ}$ $3d^{4}F-4f^{4}D^{\circ}$ $3d^{4}P-4f^{4}D^{\circ}$ $3d^{4}F-4f^{4}D^{\circ}$ $3d^{4}P-4f^{4}D^{\circ}$	3/2 - 5/2 $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$
4535,47 4534,66 4522,66 4517,79 4514,80	3 2 4 2 2	34,83 34,81 34,93 34,80 34,80	37,56 37,55 37,67 37,54 37,55	$3d {}^{4}F - 4f {}^{4}D^{\circ}$ $3d {}^{2}F - 4f {}^{4}D^{\circ}$ $3d {}^{2}P - 4f {}^{4}F^{\circ}$ $3d {}^{4}F - 4f {}^{4}D^{\circ}$ $3d {}^{4}F - 4f {}^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
4511 ,37 4511 ,29 4508 ,21 4502 ,52 4498 ,94	4 2 3 0,5 5	34,93 34,88 34,88 34,80 34,81	37,67 37,62 37,63 37,55 37,56	$3d^{2}P-4f^{2}D^{\circ}$ $3d^{2}P-4f^{2}D^{\circ}$ $3d^{2}P-4f^{4}F^{\circ}$ $3d^{4}F-4f^{4}F^{\circ}$ $3d^{4}P-4f^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \\ 1/2 - 1/2 \end{array} $
4475 ,22 4471 ,52 4468 ,91 4456 ,95 4452 ,55	1 3 5 5 1	34,86 34,86 34,77 34,77	37,63 37,63 37,54 37,55 —	$3d ^4P - 4f ^4F^\circ$ $3d ^4P - 4f ^4F^\circ$ $3d ^2D - 4f ^4D^\circ$ $3d ^2D - 4f ^4D^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4446,46 4442,67 4439,95 4439,30 4432,26	3 2 3 1	34,84 34,84 34,77 34,84 37,86	37,63 37,63 37,56 37,63 40,66	$3d {}^{4}F - 4f {}^{4}F^{\circ}$ $3d {}^{4}F - 4f {}^{4}F^{\circ}$ $3d {}^{2}D - 4f {}^{4}D^{\circ}$ $3d {}^{4}P - 4f {}^{4}F^{\circ}$ $3p'' {}^{2}P^{\circ} - 3d'' {}^{2}D$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4431 ,67 4430 ,90 4429 ,60 4428 ,54 4421 ,38	1 4 2 6 3	37,86 34,83 37,86 34,84 34,75 34,84	40,66 37,63 40,66 37,64 37,55 37,64	$3p'' ^2P^{\circ} - 3d'' ^2D$ $3d ^4F - 4f ^4F^{\circ}$ $3p'' ^2P^{\circ} - 3d'' ^2D$ $3d ^4F - 4f ^4G^{\circ}$ $3d ^2D - 4f ^4D^{\circ}$ $3d ^4P - 4f ^4G^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4416,77 4413,20 4412,54 4409,30 4397,94	2	34,75 { 34,83 { 34,86 34,74 34,84 34,74	37,55 37,64 37,67 37,54 37,65 37,55	$3d^{2}D-4f^{4}D^{\circ}$ $3d^{4}F-4f^{4}G^{\circ}$ $3d^{4}F-4f^{4}F^{\circ}$ $3d^{4}F-4f^{4}D^{\circ}$ $3d^{4}F-4f^{4}F^{\circ}$ $3d^{4}F-4f^{4}F^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 9/2 - 7/2 \\ 5/2 - 7/2 \\ 9/2 - 9/2 \end{array} $
4391,94 4385,00 4384,08 4379,50 4377,95	7 2 1 6 2	34,80 34,84 34,81 34,80 34,84	37,62 37,67 37,64 37,63 37,67	$3d\ ^{4}F-4f\ ^{4}F^{\circ}$ $3d\ ^{4}F-4f\ ^{4}F^{\circ}$ $3d\ ^{2}F-4f\ ^{4}G^{\circ}$ $3d\ ^{4}F-4f\ ^{4}F^{\circ}$ $3d\ ^{4}F-4f\ ^{4}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4369,77 4365,72 4346,12 4341,42 4339,78	5 2 1 2 1	34,83 34,80 — 34,81 34,77	37,67 37,64 — 37,67 37,63	$3d^{4}F - 4f^{4}F^{\circ}$ $3d^{4}F - 4f^{4}G^{\circ}$ - $3d^{2}F - 4f^{4}F^{\circ}$ $3d^{2}D - 4f^{4}F^{\circ}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{5}{2} $ $ - \frac{5}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $
4325,15 4322,66 4322,26 4290,40 4257,82	1 1 2 6 3	34,77 	37,64 	$3d\ ^{2}D-4f\ ^{4}G^{\circ} \\ -3d\ ^{4}F-4f\ ^{4}G^{\circ} \\ 3d\ ^{4}D-4f\ ^{4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4257 ,25 4250 ,68	1 4	34,63		$3d$ 4D $-4f$ 4D $^\circ$	 3/ ₂ ⁵ / ₂

1	-	1			
λ, Å	I	$E_{_{ m II}},~{ m eV}$	E _B , eV	Transition	J
4244 ,17	0	34,75	37,67	3d ² D-4f ⁴ F°	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
4242 ,20	1	34,64	37,56	3d ⁴ D-4f ⁴ D°	
4239 ,95	2	34,63	37,55	3d ⁴ D-4f ⁴ D°	
4233,86 4231,60 4224,57 4220,92 4219,76	3 4 1 2 6	34,62 34,63 34,62 34,61	37,55 37,56 37,55 37,55	$-3d\ ^4D-4f\ ^4D^\circ \ 3d\ ^4D-4f\ ^4D^\circ \ 3d\ ^4J-4f\ ^4D^\circ \ 3d\ ^4D-4f\ ^4D^\circ \ $	$ \begin{array}{c} - \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \end{array} $
4217,15	3	34,61	37,55	3d ⁴ D—4f ⁴ D°	7/2 - 5/2 $7/2 - 9/2$ $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
4206,43	2	34,61	37,55	3d ⁴ D—4f ⁴ F°	
4150,67	3	34,64	37,63	3d ⁴ D—4f ⁴ F°	
4133,65	3	34,63	37,63	3d ⁴ D—4f ⁴ F°	
4118,10	0	34,63	37,64	3d ⁴ D—4f ⁴ G°	
4100,30	1	34,62	37,64	3d ⁴ D-4f ⁴ G°	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
4098,77	4	34,61	37,63	3d ⁴ D-4f ⁴ F°	
4086,69	1	34,61	37,64	3d ⁴ D-4f ⁴ G°	
4080,48	2	34,63	37,67	3d ⁴ D-4f ⁴ F°	
4062,90	3	34,62	37,67	3d ⁴ D-4f ⁴ F°	
3999 ,86 3942 ,19 3840 ,48 3829 ,77 3823 ,19	1 3 1 7 1	 31 ,51		- - 3d ² P°-3d ² D	- - - 3/ ₂ ⁵ / ₂
3818,44	6	31,53	34,77	$3p ^{2}P^{\circ}$ — $3d ^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3806,30	2	31,36	34,62	$3p ^{4}S^{\circ}$ — $3d ^{4}D$	
3800,02	5	31,51	34,77	$3p ^{2}P^{\circ}$ — $3d ^{2}D$	
3790,96	3	31,36	34,63	$3p ^{4}S^{\circ}$ — $3d ^{4}D$	
3777,16	8	27,27	30,55	$3s ^{4}P$ — $3p ^{4}P^{\circ}$	
3766 ,29	8	27,23	30,52	$3s ^4P - 3p ^4P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3753 ,83	5	31,51	34,81	$3p ^2P^{\circ} - 3d ^2F$	
3751 ,26	5	27,27	30,57	$3s ^4P - 3p ^4P^{\circ}$	
3744 ,66	4	31,53	34,84	$3p ^4P^{\circ} - 3d ^4P$	
3734 ,94	7	27,23	30,55	$3s ^4P - 3p ^4P^{\circ}$	
3727,08	9	27,86	31,18	$3s^{2}P - 3p^{2}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
3721,86	2	31,51	34,84	$3p^{2}P^{\circ} - 3d^{4}F$	
3713,084	10	27,78	31,12	$3s^{2}P - 3p^{2}D^{\circ}$	
3709,64	7	27,23	30,57	$3s^{4}P - 3p^{4}P^{\circ}$	
3701,81	4	31,51	34,86	$3p^{2}P^{\circ} - 3d^{4}P$	
3697,09	2	31,53	34,88	$3p^{2}P^{\circ}-3d^{2}P$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3694,197	10	27,17	30,52	$3s^{4}P-3p^{4}P^{\circ}$	
3679,80	2	31,51	34,88	$3p^{2}P^{\circ}-3d^{2}P$	
3664,112	9	27,17	30,55	$3s^{4}P-3p^{4}P^{\circ}$	
3659,93	3	31,36	34,75	$3p^{4}S^{\circ}-3d^{2}D$	
3644,86	4	31,53	34,93	$3p^{2}P^{\circ}-3d^{2}P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
3643,89	5	27,78	31,18	$3s^{2}P-3p^{2}D^{\circ}$	
3632,75	2	31,36	34,77	$3p^{4}S^{\circ}-3d^{2}D$	
3628,06	4	31,51	34,93	$3p^{2}P^{\circ}-3d^{2}P$	
3612,35	3	31,34	34,77	$3p^{2}S^{\circ}-3d^{2}D$	
3594 ,18	4	31,36	34,81	$3p {}^{4}S^{\circ} - 3d {}^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3590 ,47	2	31,36	34,81	$3p {}^{4}S^{\circ} - 3d {}^{2}F$	
3574 ,64	5	30,55	34,02	$3s' {}^{2}D - 3p' {}^{2}F^{\circ}$	
3574 ,23	0	30,55	34,02	$3s' {}^{2}D - 3p' {}^{2}F^{\circ}$	
3571 ,26	4	31,36	34,83	$3p {}^{4}S^{\circ} - 3d {}^{4}F$	
3568,53	6	30,55	34,02	$3s' ^{2}D - 3p' ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
3565,84	4	31,36	34,84	$3p ^{4}S^{\circ} - 3d ^{4}P$	
3561,23	4	31,36	34,84	$3p ^{4}S^{\circ} - 3d ^{4}F$	
3557,84	4	27,86	31,34	$3s ^{2}P - 3p ^{2}S^{\circ}$	
3554,39	1	31,12	34,61	$3p ^{2}D^{\circ} - 3d ^{4}D$	

λ, λ	I	$E_{ m H}^{},$ eV	$E_{_{ m B}},{ m eV}$	Transition	J
3551,52 3546,22 3542,90 3542,28 3539,94	1 1 7 2 0,5	31,34 31,34 34,36 34,38 34,38	34,83 34,84 34,86 37,88 37,88	$3p ^2S^{\circ} - 3d ^4F$ $3p ^2S^{\circ} - 3d ^4P$ $3p ^4S^{\circ} - 3d ^4P$ $3p' ^2D^{\circ} - 3d' ^2P$ $3p' ^2D^{\circ} - 3d' ^2P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
3537,99 3522,72 3503,61 3481,96 3480,75	3 1 5 6 2	37,38 31,36 31,34 27,78 34,30	37,89 34,88 34,88 31,34 37,86	$3p' ^{2}D^{\circ} - 3d' ^{2}P$ $3p ^{4}S^{\circ} - 3d ^{2}P$ $3p ^{2}S^{\circ} - 3d ^{2}P$ $3s ^{2}P - 3p ^{2}S^{\circ}$ $3s'' ^{2}S - 3p'' ^{2}P^{\circ}$	3/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 1/2$ $1/2 - 3/2$
3479,53 3477,69 3475,25 3459,38 3457,16	1 3 1 2 4	34,30 31,18 31,36 34,38 34,38	37,86 34,75 34,93 37,97 37,97	$3s'' {}^{2}S - 3p'' {}^{2}P^{\circ}$ $3p {}^{2}D^{\circ} - 3d {}^{2}D$ $3p {}^{4}S^{\circ} - 3d {}^{2}P$ $3p' {}^{2}D^{\circ} - 3d' {}^{2}D$ $3p' {}^{2}D^{\circ} - 3d' {}^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3456,68 3453,10 3443,70 3442,12 3440,80	4 3 2 1 1	31,34 31,18 31,53 31,36 34,28	34,93 34,77 35,13 34,96 37,89	$3p {}^{2}S^{\circ} - 3d {}^{2}P$ $3p {}^{2}D^{\circ} - 3d {}^{2}D$ $3p {}^{2}P^{\circ} - 4s {}^{2}P$ $3p {}^{4}S^{\circ} - 4s {}^{4}P$ $3p' {}^{2}P^{\circ} - 3d' {}^{2}P$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 1/_2 \end{array} $
3438,97 3428,76 3417,71 3416,87 3414,82	2 5 5 4 2	34,28 31,51 31,12 31,12 31,18	37,88 35,13 34,75 34,75 34,81	$3p' ^{2}P - 3d' ^{2}P$ $3p ^{2}P^{\circ} - 4s ^{2}P$ $3p ^{2}D^{\circ} - 3d ^{2}F$ $3p ^{2}D^{\circ} - 3d ^{2}D$ $3p ^{2}D^{\circ} - 3d ^{2}F$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3413,13 3411,38 3406,88 3404,77 3397,90	3 1 5 4 1	34,25 34,25 34,38 34,38 31,36	37,89 37,88 38,02 38,02 35,01	$3p' \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$ $3p' \ ^{2}D^{\circ} - 3d' \ ^{2}D$ $3p \ ^{4}S^{\circ} - 4s \ ^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
3392 ,78 3390 ,56 3388 ,46 3386 ,24 3379 ,39	5 2 6 2 1	27,86 30,97 31,18 30,96 30,97	31,51 34,63 34,84 34,62 34,64	$3s {}^{2}P - 3p {}^{2}P^{\circ}$ $3p {}^{4}D^{\circ} - 3d {}^{4}D$ $3p {}^{2}D^{\circ} - 3d {}^{4}F$ $3p {}^{4}D^{\circ} - 3d {}^{4}D$ $3p {}^{4}D^{\circ} - 3d {}^{4}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
3378 ,28 3377 ,23 3374 ,10 3371 ,87 3367 ,20	5 1 3 4 6	27,86 31,53 30,96 31,18 31,12	31,53 35,20 34,63 34,86 34,80	$3s {}^{2}P - 3p {}^{2}P^{\circ}$ $3p {}^{2}P^{\circ} - 4s {}^{2}P$ $3p {}^{4}D^{\circ} - 3d {}^{4}D$ $3p {}^{2}D^{\circ} - 3d {}^{4}P$ $3p {}^{2}D^{\circ} - 3d {}^{4}F$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 7/_{2} \end{array} $
3362,89 3360,63 3357,90 3356,35 3355,05	2 5 3 2 7	30,96 27,27 30,93 31,12 27,23	34,64 30,96 34,62 34,81 30,93	$3p ^4D^{\circ} - 3d ^4D$ $3s ^4P - 3p ^4D^{\circ}$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^2D^{\circ} - 3d ^2F$ $3s ^4P - 3p ^4D^{\circ}$	3/2— $1/2$ $1/2$ — $3/2$ $5/2$ — $5/2$ $5/2$ — $5/2$ $3/2$ — $5/2$
3353,63 3345,88 3345,49 3344,43 3336,12	2 1 3 5 2	31,18 { 30,93 30,55 30,55 27,27 34,25	34,88 34,63 34,25 34,25 30,97 37,97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
3334,87 3330,78 3329,20 3327,16 3323,75	10 2 4 5 7	27,17 31,12 30,88 27,23 27,78	30,88 34,84 34,61 30,96 31,51	$\begin{array}{c} 3s ^4P - 3p ^4D^{\circ} \\ 3p ^2D^{\circ} - 3d ^4F \\ 3p ^4D^{\circ} - 3d ^4D \\ 3s ^4P - 3p ^4D^{\circ} \\ 3s ^2P - 3p ^2P^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3320,29 3319,75 3314,60	2 3 1	30,88 30,55 31,12	34,62 34,28 34,86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} ^{7}/_{2} - ^{5}/_{2} \\ ^{3}/_{2} - ^{1}/_{2} \\ ^{5}/_{2} - ^{5}/_{2} \end{array} $

λ, λ	I	E _H , eV	$E_{\mathrm{B}},\ \mathrm{eV}$	Transition	J
3311,30	3	27,23	30,97	3s ⁴ P-3p ⁴ D°	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3310,55	1	31,18	34,93	3p ² D°-3d ² P	
3309,78	3	27,78	31,53	$3s^{2}P - 3p^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3297,74	7	27,17	30,93	$3s^{4}P - 3p^{4}D^{\circ}$	
3275,20	2	31,34	35,43	$3p^{2}S^{\circ} - 4s^{2}P$	
3270,79	2	27,17	30,96	$3s^{4}P - 3p^{4}D^{\circ}$	
3269,86	3	30,96	34,75	$3p^{4}D^{\circ} - 3d^{2}D$	
3263,43	3	30,97	34,77	$3p \ ^4D^{\circ} - 3d \ ^2D$	$\begin{array}{c} 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array}$
3255,39	2	31,12	34,93	$3p \ ^2D^{\circ} - 3d \ ^2P$	
3248,15	3	30,96	34,77	$3p \ ^4D^{\circ} - 3d \ ^2D$	
3244,15	5	30,93	34,75	$3p \ ^4D^{\circ} - 3d \ ^2F$	
3243,34	2	30,93	34,75	$3p \ ^4D^{\circ} - 3d \ ^2D$	
3232,38	3	30,55	34,38	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$	3/2 - 3/2 $ 5/2 - 3/2 $ $ 5/2 - 5/2 $ $ 7/2 - 9/2 $ $ 5/2 - 7/2$
3231,97	0	30,55	34,38	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$	
3230,46	5	30,55	34,38	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$	
3229,50	3	34,02	37,86	$3p' \ ^{2}F^{\circ} - 3a' \ ^{2}G$	
3224,82	4	34,02	37,86	$3p' \ ^{2}F^{\circ} - 3d' \ ^{2}G$	
3218,21 3214,38 3213,70 3209,38 3208,99	8 5 3 2	30,88 30,96 30,97 30,97 30,88	34,74 34,81 34,83 34,84 34,75	$3p {}^{4}D^{\circ} - 3d {}^{4}F$ $3p {}^{4}D^{\circ} - 3d {}^{2}F$ $3p {}^{4}D^{\circ} - 3d {}^{4}F$ $3p {}^{4}D^{\circ} - 3d {}^{4}P$ $3p {}^{4}D^{\circ} - 3d {}^{2}F$	7/2 - 9/2 $3/2 - 5/2$ $1/2 - 3/2$ $1/2 - 3/2$ $7/2 - 7/2$
3198,62	5	30,93	34,80	$3p ^4D^{\circ} - 3d ^4F$	$ \begin{array}{r} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3194,61	4	30,96	34,84	$3p ^4D^{\circ} - 3d ^4P$	
3190,86	2	30,96	34,84	$3p ^4D^{\circ} - 3d ^4F$	
3188,74	3	30,93	34,81	$3p ^4D^{\circ} - 3d ^2F$	
3187,60	2	27,23	31,12	$3s ^4P - 3p ^2D^{\circ}$	
3176,16	3	30,96	34,86	$3p ^4D^{\circ} - 3d ^4P$	3/2 - 5/2 $ 5/2 - 3/2 $ $ 5/2 - 3/2 $ $ 5/2 - 5/2 $ $ 7/2 - 7/2$
3173,58	3	30,93	34,83	$3p ^4D^{\circ} - 3d ^4F$	
3169,30	0	30,93	34,84	$3p ^4D^{\circ} - 3d ^4P$	
3165,70	4	30,93	34,84	$3p ^4D^{\circ} - 3d ^4F$	
3164,46	3	30,88	34,80	$3p ^4D^{\circ} - 3d ^4F$	
3154,82	1	30,88	34,81	$3p ^4D^{\circ} - 3d ^2F$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
3151,16	2	30,93	34,86	$3p ^4D^{\circ} - 3d ^4P$	
3143,74	2	31,18	35,13	$3p ^2D^{\circ} - 4s ^2P$	
3141,35	3	34,25	38,20	$3p' ^2P^{\circ} - 3d' ^2F$	
3135,82	1	27,17	31,12	$3s ^4P - 3p ^2D^{\circ}$	
3132,22	2	30,88	34,84	$3p ^4D^{\circ} - 3d ^4F$	7/2— $5/2$ $7/2$ — $5/2$ $7/2$ — $5/2$ $5/2$ — $3/2$ $5/2$ — $5/2$
3148,02	4	30,88	34,86	$3p ^4D^{\circ} - 3d ^4P$	
3097,15	3	34,02	38,02	$3p' ^2F^{\circ} - 3d' ^2D$	
3094,08	4	31,12	35,43	$3p ^2D^{\circ} - 4s ^2P$	
3092,91	2	34,02	38,02	$3p' ^2F^{\circ} - 3d' ^2D$	
3088,23 3072,68 3074,08 3059,16 3054,69	3 1 2 3 5	31,18 30,97 34,28 30,93 30,96 30,57	35,20 35,01 38,32 34,96 35,01 34,63	$3p ^{2}D^{\circ}-4s ^{2}P$ $3p ^{4}D^{\circ}-4s ^{4}P$ $3p' ^{2}P^{\circ}-3d' ^{2}S$ $3p ^{4}D^{\circ}-4s ^{4}P$ $3p ^{4}D^{\circ}-4s ^{4}P$ $3p ^{4}P^{\circ}-3d ^{4}D$	3/2— $1/2$ $1/2$ — $3/2$ $1/2$ — $1/2$ $5/2$ — $5/2$ $3/2$ — $3/2$ $1/2$ — $3/2$
3050,57	1	34,25	38,32	3p' ² P°—3d' ² S	3/2 - 1/2 $3/2 - 5/2$ $1/2 - 1/2$ $1/2 - 1/2$ $7/2 - 5/2$
3047,57	6	30,55	34,62	3p ⁴ P°—3d ⁴ D	
3045,58	4	30,57	34,64	3p ⁴ P°—3d ⁴ D	
3044,16	2	30,97	35,05	3p ⁴ D°—4s ⁴ P	
3039,65	3	30,88	34,96	3p ⁴ D°—4s ⁴ P	
3037,73	4	30,55	34,63	$3p ^4P^{\circ} - 3d ^4D$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{3}{2} $
3035,98	3	30,93	35,01	$3p ^4D^{\circ} - 4s ^4P$	
3034,48	5	30,52	34,61	$3p ^4P^{\circ} - 3d ^4D$	
3030,792	2	30,96	35,05	$3p ^4D^{\circ} - 4s ^4P$	
3028,860	4	27,27	31,36	$3s ^4P - 3p ^4S^{\circ}$	
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		<u> </u>	- -		
λ, λ	I	$E_{\rm H}$, eV	$E_{\rm B}$. eV	Transition	<i>J</i>
3027,011 3017,348 3001,663 2973,07 2967,181	4 3 6 1 3	30,52 30,52 27,23 34,02 34,02	34,62 34,63 31,36 38,18 38,20	$3p {}^{4}P^{\circ} - 3d {}^{4}D$ $3p {}^{4}P^{\circ} - 3d {}^{4}D$ $3s {}^{4}P - 3p {}^{4}S^{\circ}$ $3p' {}^{2}F^{\circ} - 3d' {}^{2}F$ $3p' {}^{2}F^{\circ} - 3d' {}^{2}F$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
2963,235 2955,73 2953,10 2951,10 2935,30	2 7 0 2 1	34,02 27,47 30,55 30,57 30,55	38,20 31,36 34,75 34,77 34,77	$3p' ^{2}F^{\circ} - 3d' ^{2}F$ $3s ^{4}P - 3p ^{4}S^{\circ}$ $3p ^{4}P^{\circ} - 3d ^{2}D$ $3p ^{4}P^{\circ} - 3d ^{2}D$ $3p ^{4}P^{\circ} - 3d ^{2}D$	5/2 - 5/2 $ 5/2 - 5/2 $ $ 5/2 - 5/2 $ $ 3/2 - 5/2 $ $ 1/2 - 3/2 $ $ 3/2 - 3/2$
2933,70 2925,623 2916,16 2910,059 2906,815	2 3 1 5 3	30,52 30,57 30,52 30,55 30,57	34 ,75 34 ,81 34 ,77 34 ,81 34 ,84	$3p {}^{4}P^{\circ} - 3d {}^{2}D$ $3p {}^{4}P^{\circ} - 3d {}^{4}P$ $3p {}^{4}P^{\circ} - 3d {}^{2}D$ $3p {}^{4}P^{\circ} - 3d {}^{4}P$ $3p {}^{4}P^{\circ} - 3d {}^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2897,03 2891,36 2888,43 2878,13 2876,43	$\begin{array}{c} 2 \\ 0, 5 \\ 1 \\ 0, 5 \\ 4 \end{array}$	30,52 30,55 30,55 30,57 30,52	34,80 34,84 34,84 34,88 34,88	$3p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{F}$ $3p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{P}$ $3p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{F}$ $3p \stackrel{4}{P}^{\circ} - 3d \stackrel{2}{P}$ $3p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{F}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
2873;00 2869;95 2858;01 2809;50 2794;220	3 2 2 4 3	30,52 30,52 30,52 30,55 30,55	34,84 34,84 34,86 34,96 35,01	$3p {}^{4}P^{\circ} - 3d {}^{4}P$ $3p {}^{4}P^{\circ} - 3d {}^{4}F$ $3p {}^{4}P^{\circ} - 3d {}^{4}P$ $3p {}^{4}P^{\circ} - 4s {}^{4}P$ $3p {}^{4}P^{\circ} - 4s {}^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2792,045 2780,023 2770,06 2762,922 2756,746	5 2 1 3 3	30,52 30,55 30,57 30,52 30,55	34,96 35,01 35,05 35,01 35,05	3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 4P	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
1938,827 1930,033 1928,787 1916,082 1907,494	8 8 1 10 8	27 .86 27 ,86 — 27 ,78 27 ,78	34,25 34,28 — 34,25 34,28	$\begin{array}{c} 3s ^{2}P - 3p' ^{2}P^{\circ} \\ 3s ^{2}P - 3p' ^{2}P^{\circ} \\ - \\ 3s ^{2}P - 3p' ^{2}P^{\circ} \\ 3s ^{2}P - 3p' ^{2}P^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1889,714 1888,110 1883,799 1880,21 1854,11	1 1 1 3 1	_ _ _ _	 	 	
1853,22 1732,69 1688,356 1681,683 462,388	1 1 4 3 14	$\begin{array}{c} - \\ - \\ 26,91 \\ 26,91 \\ 0,10 \end{array}$		$\begin{array}{c} - \\ - \\ 2p^6 {}^2S - 3p' {}^2P^{\circ} \\ 2p^6 {}^2S - 3p' {}^2P^{\circ} \\ 2p^5 {}^2P^{\circ} - 2p^6 {}^2S \end{array}$	$\begin{array}{c}$
460 ,725 456 ,895 456 ,344 455 ,270 454 ,648	15 5 4 7 5	0,00 0,10 0,00 0,00 0,00	26,94 27,23 27,47 27,23 27,27	$2p^{5} {}^{2}P^{\circ} - 2p^{6} {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{4}P$	$ \begin{array}{c} 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \end{array} $
447,813 446,591 446,252 445,032 407,136	8 7 8 7 8	0,10 0,10 0,00 0,00 0,10	27,78 27,86 27,78 27,86 30,55	$2p^{5} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{\prime}{}^{2}D$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 3/_2 \end{array} $
405,852 362,456 361,427	9 4 5	0,00 0,10 0,00	30,55 34,30 34,30	$2p^{5} {}^{2}P^{\circ} - 3s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3s'' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 3s'' {}^{2}S$	$\frac{3}{2}$ $\frac{5}{2}$, $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$

λ, Å	I	$E_{ m H}$, eV	EB, eV	Transition	J
357,534 356,795	5 5	0,10 0,00	34,77 34,75	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D \ 2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$	$^{1}/_{2}$ _ $^{3}/_{2}$ $^{3}/_{2}$ _ $^{5}/_{2}$
356,534 356,436 356,131 355,946 355,848	3 2 4 2 1	0,00 0,10 0,00 0,10 0,00	34,77 34,88 34,81 34,93 34,84	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}F$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$	3/2 - 3/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$
355,647 355,450 354,954 353,922 353,206	3 2 4 2 3	0,00 0,00 0,00 0,10 0,10	34,86 34,88 34,93 35,13 35,20	$2p^{5} ^{2}P^{\circ} - 3d ^{4}P$ $2p^{5} ^{2}P^{\circ} - 3d ^{2}P$ $2p^{5} ^{2}P^{\circ} - 3d ^{2}P$ $2p^{5} ^{2}P^{\circ} - 4s ^{2}P$ $2p^{5} ^{2}P^{\circ} - 4s ^{2}P$	3/2 - 5/2 $3/2 - 1/2$ $3/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$
352,946 352,237 331,50 331,06 330,77	4 2 2 1 3	0,00 0,00 0,10 0,10 0,00	35,13 35,20 37,50 37,55 37,48	$2p^{5} 2P^{\circ}-4s^{2}P$ $2p^{5} 2P^{\circ}-4s^{2}P$ $2p^{5} 2P^{\circ}-4d^{2}D$ $2p^{5} 2P^{\circ}-4d^{2}P$ $2p^{5} 2P^{\circ}-4d^{2}D$	3/2 - 3/2 $3/2 - 1/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 5/2$
330,62 330,20 328,08 327,63 327,33	2 2 2 2 3	0,00 0,00 0,10 0,10 0,10	37,50 37,55 37,89 37,94 37,97	$2p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$	$\begin{array}{c} 3/_2 - 3/_2 \\ 3/_2 - 3/_2, & 1/_2 \\ 1/_2 - 3/_2, & 1/_2 \\ 1/_2 - 3/_2 \\ 1/_2 - 3/_2 \end{array}$
327,25 326,77 326,54 324,56	2 3 5 2	00,00 00,00 00,00 00,00	37,89 37,94 37,97 38,20	$2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 4s' \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

Ne III, ground state $1s^2 2s^2 2p^{4\,3} P_2$ Ionization potential 514148 cm $^{-1}$; 63,742 eV

λ, Å	I	$E_{ m H}$, eV	$E_{ m B}$, eV	Transition	J
2825,82 2825,28	5 4	46,43 46,42	50 ,81 50 ,81	3s" ³ P°—3p" ³ D 3s" ³ P°—3p" ³ D	0 —1 1—2
2824 ,47 2822 ,95	3 7	$46,42 \\ 46,42$	50,82 50,81	3s" 3P°—3p" 3D 3s" 3P°—3p" 3D	$\begin{array}{c} 1 - 1 \\ 2 - 3 \end{array}$
2802,34 2800,24	2 3	46,42 46,42	50,85 50,85	$3s'' ^3P^{\circ} - 3p'' ^3S$ $3s'' ^3P^{\circ} - 3p'' ^3S$	$1-1 \\ 2-1$
2787 ,73 2786 ,89 2786 ,17	4 3 2	43,79 $43,79$ $43,79$	48,23 48,23 48,23	$3s' \ ^{3}D^{\circ} - 3p' \ ^{3}D$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}D$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}D$	$egin{array}{c} 1-1 \\ 1-2 \\ 2-1 \end{array}$
2785,29 2783,03	5	43,79 43,78	48,23 48,24	$3s' \ ^{3}D^{\circ} - 3p' \ ^{3}D$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}D$	$\begin{array}{c} 2 - 1 \\ 2 - 2 \\ 3 - 2 \end{array}$
2777,65 2678,64	$\begin{array}{c}2\\7\\25\end{array}$	$\frac{43,78}{39,60}$	48,24 $44,23$	$\frac{3s'}{3s}\frac{3I}{3}$ ° $-\frac{3p'}{3p}\frac{3I}{3P}$	3—3 1—1
$2677,90 \\ 2642,42$	$\frac{30}{3}$	$39,60 \\ 46,42$	44 ,23 51 ,12	3s 3S°—3p 3P 3s" 3P°—3p" 3P	1—2, 0 1—0
2642,25 2641,07 2640,56	$\begin{array}{c}2\\10\\6\end{array}$	46,42 $46,42$ $46,42$	51, 12 51, 12 51, 12	3s" 3P°—3p" 3P 3s" 3P°—3p" 3P 3s" 3P°—3p" 3P	0—1 1—1
2639,18 2638,70	5 10	46,42 46,42	51,12 51,12 51,12	$3s'' ^3P - 3p'' ^3P$ $3s'' ^3P ^0 - 3p'' ^3P$	1—2 2—1 2—2
2615,87 2614,51	10 4	43,79 43,79	48,53 48,53	3s' 3D°—3p' 3F 3s' 3D°—3p' 3F	$\begin{array}{c} 1-2 \\ 2-2 \end{array}$
000				•	

λ, Å	I	$E_{ m H},~{ m eV}$	$E_{_{ m B}},$ eV	Transition	J
2613,41 2611,42 2610,03	12 4 15	43,79 43,78 43,78	48,53 48,53 48,53	$3s' \ ^{3}D^{\circ} - 3p' \ ^{3}F$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}F$ $3s' \ ^{3}D^{\circ} - 3p' \ ^{3}F$	2—3 3—3 3—4
2595,68 2593,60 2590,04 2473,40	20 30 40 10	38,95 38,95 38,95	43,72 43,72 47,73	3s ⁵ S°—3p ⁵ P 3s ⁵ S°—3p ⁵ P 3s ⁵ S°—3p ⁵ P	2-1 2-2 2-3
2468,20	4	49,48	54,50	3p' 3P—3d' 3P°	1-2
2463,38 2462,35 2460,84 2457,55 2454,98	2 6 1 2 5	49,48 49,47 49,48 49,48 49,47	54,51 54,50 54,51 54,52 54,51	$3p' \ ^{3}P - 3d' \ ^{3}P^{\circ} \ 3p' \ ^{3}P - 3d' \ ^{3}P^{\circ}$	0-1 $2-2$ $1-1$ $1-0$ $2-1$
2441,90 2439,34 2433,62 2413,78 2413,54	2 5 8 10 6	49,48 49,48 49,47 44,23 44,23	54,56 54,56 54,56 49,37 49,37	$3p' \ ^{3}P - 3d' \ ^{3}S^{\circ}$ $3p' \ ^{3}P - 3d' \ ^{3}S^{\circ}$ $3p' \ ^{3}P - 3d' \ ^{3}S^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}D^{\circ}$ $3p \ ^{3}P - 3d \ ^{3}D^{\circ}$	0-1 $1-1$ $2-1$ 2 , $0-1$ $2-2$
2413,18 2412,94 2412,73 2266,98 2266,16	8 12 15 5 8	44,23 44,23 44,23 48,53 48,53	49,37 49,37 49,37 54,00 54,00	$3p ^3P - 3d ^3D^{\circ}$ $3p ^3P - 3d ^3D^{\circ}$ $3p ^3P - 3d ^3D^{\circ}$ $3p' ^3F - 3d' ^3F^{\circ}$ $3p' ^3F - 3d' ^3F^{\circ}$	1-1 1-2 2-3 3-2 2-2
2264,91 2264,11 2263,21 2262,16 2216,07	10 3 12 2 15	48,53 48,53 48,53 48,53 48,53	54,00 54,00 54,01 54,01 54,12	$3p' \ ^3F - 3d' \ ^3F^\circ$ $3p' \ ^3F - 3d' \ ^3G^\circ$	3—3 2—3 4—4 3—4 4—5
2214,77 2213,76 2212,63 2211,85 2209,35	4 12 5 10 10	48,53 48,53 48,53 48,53 —	54,13 54,13 54,13 54,13	$3p' \ ^3F - 3a' \ ^3G^{\circ}$ $3p' \ ^3F - 3a' \ ^3G^{\circ}$ $3p' \ ^3F - 3a' \ ^3G^{\circ}$ $3p' \ ^3F - 3a' \ ^3G^{\circ}$	4—4 3—4 3—3 2—3
2208,04 2207,29 2205,95 2204,98 2202,22	4 8 5 7 7	 48,53		3p' 3F-3d' 3D°	 4—3
2201,23 2197,86 2197,10 2194,92 2190,29	4 7 3 5 7	48,53 48,53 48,53 48,53	54,16 54,17 54,17 54,17	$3p' \ ^3F - 3d' \ ^3D^{\circ} \ 3p' \ ^3F - 3d' \ ^3D^{\circ} \ 3p' \ ^3F - 3d' \ ^3D^{\circ} \ -$	3—3 3—2 2—2 2—1
2183,24 2182,28 2180,89 2178,69 2177,73	2 3 10 4 8	43,79 43,79 43,78 43,79 43,79	49,47 49,47 49,47 49,48 49,48	$3s' \ ^3D^{\circ} - 3p' \ ^3P$ $3s' \ ^3D^{\circ} - 3p' \ ^3P$	1-2 2-2 3-2 1-1 2-1
2176,67 2163,77 2161,22 2161,04 2160,88	5 15 10 6 2	43,79 43,73 43,72 43,72 43,72	49,48 49,46 49,46 49,46 49,46	$3s' \ ^3D^{\circ} - 3p' \ ^3P$ $3p \ ^5P - 3d \ ^5D^{\circ}$ $3p \ ^5P - 3d \ ^5D^{\circ}$ $3p \ ^5P - 3d \ ^5D^{\circ}$ $3p \ ^5P - 3d \ ^5D^{\circ}$	1—0 3—4 2—3 2—2 2—1
2159,60 2159,44 2153,15 2151,78 2151,26	4 5 2 3 5	43,72 43,72 48,24 48,23 48,23	49,46 49,46 54,00 54,00 54,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 3-3 \\ 2-2 \\ 1-2 \end{array} $

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λ, λ	I	E _H , eV	E _B , eV	Transition	J
2150,70 2149,92 2095,54 2092,44 2089,43 2088,92 2087,44 2086,96	8 6 20 12 15 5 7	48,24 48,23 48,24 48,23 48,24 48,23 48,23 48,23 48,23 48,24	54,01 54,00 54,16 54,16 54,17 54,17 54,17 54,17	$3p'\ ^3D - 3d'\ ^3F^\circ$ $3p'\ ^3D - 3d'\ ^3F^\circ$ $3p'\ ^3D - 3d'\ ^3D^\circ$	3-4 2-3 3-3 2-3 3-2 2-2 1-2 2-1 1-1
1257,190 1255,685 1255,026	6 5 2	39,60 39,60 39,60	49,47 49,48 45,48	$\frac{3s}{3s} \frac{3s}{3s} - \frac{3p}{3p} \frac{3p}{3p}$ $3s \frac{3s}{3s} - \frac{3p}{3p} \frac{3p}{3p}$ $3s \frac{3s}{3s} - \frac{3p}{3p} \frac{3p}{3p}$	$1-2 \\ 1-1 \\ 1-0$
491,050 490,310 489,641 489,501	9 7 4 10	0,08 0,11 0,08 0.00	25,33 25,40 25,40 25,33	$2p^4$ 3P $-2p^5$ 3P 2 $2p^4$ 3P $-2p^5$ 3P 2 2 2 4 3P $-2p^5$ 3P 2 2 2 2 4 3P $-2p^5$ 3P 3	1-0 1-2 0-1 1-1 2-2
488,868 488,403 427,840 379,308 313,92	7 8 3 7 1	0,08 0,00 6,91 3,20 0,11	25,44 25,40 35,89 35,89 39,60	$2p^{4} ^{3}P - 2p^{5} ^{3}P^{\circ} \ 2p^{4} ^{3}P - 2p^{5} ^{3}P^{\circ} \ 2p^{4} ^{4}S - 2p^{5} ^{4}P^{\circ} \ 2p^{4} ^{4}D - 2p^{5} ^{4}P^{\circ} \ 2p^{4} ^{3}P - 3s ^{3}S^{\circ}$	1-0 2-1 0-1 2-1 0-1
313,677 313,048 308,559 301,124 283,894	3 4 1 4 3	0,08 0,00 6,91 3,20 0,11	39,60 39,60 47,09 44,38 43,79	$2p^{4} ^{3}P - 3s ^{3}S^{\circ}$ $2p^{4} ^{3}P - 3s ^{3}S^{\circ}$ $2p^{4} ^{1}S - 3s'' ^{1}P^{\circ}$ $2p^{4} ^{1}D - 3s' ^{1}D^{\circ}$ $2p^{4} ^{3}P - 3s' ^{3}D^{\circ}$	1-1 2-1 0-1 2-2 0-1
283,690 283,206 283,178 282,50 267,709	5 6 5 0 2	0,08 0,00 0,00 3,20 0,11	43,79 43,78 43,79 47,09 46,42	$2p^{4} ^{3}P - 3s' ^{3}D^{\circ}$ $2p^{4} ^{3}P - 3s' ^{3}D^{\circ}$ $2p^{4} ^{3}P - 3s' ^{3}D^{\circ}$ $2p^{4} ^{1}D - 3s'' ^{1}P$ $2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$	1-2, 1 2-3 2-2, 1 2-1 0-1
267,516 267,059 251,726 251,558 251,145	3 2 2 2	0,08 0,00 0,11 0,08 0,00	46,42 46,42 49,37 49,37 49,37	$2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3d' \ ^3D^\circ \ 2p^4 \ ^3P - 3d' \ ^3D^\circ \ 2p^4 \ ^3P - 3d' \ ^3D^\circ \ $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

Ne IV, ground state $1s^2 2s^2 2p^{3.4}S_{3/2}^0$ Ionization potential 782768 cm^{-1} ; 97,044 eV

λ, Α	I	$E_{ m H},~{ m eV}$	EB, eV	Transition	J
2405,49	1	59,47	64,62	$3s ^4P - 3p ^4D$	3/2-3/2
2404,28	Ü	60,64	65,80	$3s^{-2}P - 3p^{-2}D^{\circ}$	$3/\frac{2}{2}$ $3/\frac{2}{2}$
2384,95	7	59,47	64,66	$3s ^4P - 3p ^4D^{\circ}$	$5\sqrt{\frac{5}{9}}$
2384,20	3	59,40	64,59	$3s^{4}P - 3p^{-1}D^{\circ}$	$3/\frac{2}{9}-1/\frac{2}{9}$
2373 ,24	9		_	_ '	— E
2372,16	7	59,40	64,62	$3s ^4P - 3p ^4D^{\circ}$	3/2-3/
2365 ,49	4	$60,\!56$	65,80	$3s^{2}P - 3p^{2}D^{\circ}$	$\frac{1}{2} - \frac{3}{2}$
2363 ,28	6	60,64	65,89	$3s^{2}P - 3p^{2}D^{\circ}$	3/2 - 5
2362 ,68	6	59,35	64,59	$3s^{4}P = 3p^{4}D^{\circ}$	
2357 ,96	10	59,47	64,72	$3s ^4P - 3p ^4D^{\circ}$	$\frac{1}{5}/\frac{1}{2}$ $\frac{1}{7}/\frac{1}{2}$
2352,52	8	59,40	64,66	$3s^{4}P - 3p^{4}D^{\circ}$	
2350,84	G	59.35	64,62	$3s^{4}P = 3p^{4}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2293 (49	6	63,44	68,84	$3s'^{2}D - 3p'^{2}F^{\circ}$	$\frac{72}{3} \frac{72}{2} \frac{5}{2}$

λ, λ	I	E _H , eV	E _B , eV	Transition	J
$2293,14 \\ 2285,79$	2 9	63,44 63,44	68,84 68,86	$\frac{3s'}{3s} \frac{^2D}{^2D} - \frac{3p'}{3p'} \frac{^2F^{\circ}}{^2F^{\circ}}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2264,54 2262,08 2258,02 2220,81 2203,88	4 5 6 1 2	66,76 66,76 66,76 59,47 59,47	72,23 72,24 72,25 65,05 65,09	$3s' 6S^{\circ} - 3p' 6P$ $3s' 6S^{\circ} - 3p' 6P$ $3s' 6S^{\circ} - 3p' 6P$ $3s 4P - 3p 4P^{\circ}$ $3s 4P - 3p 4P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ \hline 5/2 - 7/2 \\ \hline 5/2 - 3/2 \\ \hline 5/2 - 5/2 \end{array} $
2022,192 2018,441 786,141 780,250 758,317	4 3 1 3 3	63,44 63,44 60,20 60,08 60,08	69,57 69,58 75,97 75,97 76,43	$3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$ $3s' \ ^{2}D - 3p' \ ^{2}D^{\circ}$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
609,168 606,527 605,595 602,999 543,891	1 5 2 2 150	39,73 39,64 39,73 39,64 0,00	60,08 60,08 60,20 60,08 22,79	$2p^4 ^2P - 2p^5 ^2P^\circ \ 2p^4 ^2P - 2p^5 ^2P^\circ \ 2p^4 ^2P - 2p^5 ^2P^\circ \ 2p^4 ^2P - 2p^5 ^2P^\circ \ 2p^3 ^4S^\circ - 2p^4 ^4P$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \end{array}$
542,073 541,127 539,731 536,965 521,813	100 80 3 1 25	0,00 0,00 37,11 37,11 7,71	22,87 22,91 60,08 60,20 31,47	$2p^3 {}^4S^{\circ} - 2p^4 {}^4P$ $2p^3 {}^4S^{\circ} - 2p^4 {}^4P$ $2p^4 {}^2S - 2p^5 {}^2P^{\circ}$ $2p^4 {}^2S - 2p^5 {}^2P^{\circ}$ $2p^3 {}^2P^{\circ} - 2p^4 {}^2D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
521,742 469,865	$\begin{array}{c} 25 \\ 200 \end{array}$	7,71 5,08	31,47 31,47	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}D 2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
469,817	200	5,08	31,47	$2p^3 \ ^2D^{\circ} - 2p^4 \ ^2D$	$\left\{\begin{array}{cc} 5/2 & 5/2 \\ 5/2 & 3/2 & 3/2 \end{array}\right.$
433,237 431,472	$\frac{50}{25}$	$31,47 \\ 31,47$	$60,08 \\ 60,20$	$^{2p^4}_{2p^4}^{2D} - ^{2p^5}_{2p^5}^{2P^\circ}_{2P}$	$\frac{5}{2}$, $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
421,609 388,218 387,141 358,721 357,831	150 100 125 200 50	7,71 7,71 7,71 5,08 5,08	37,11 39,64 39,73 39,64 39,73	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$	$\begin{array}{c} 3/2 \ , \ 1/2 - 1/2 \\ 3/2 \ , \ 1/2 - 3/2 \\ 3/2 \ , \ 1/2 - 1/2 \\ 5/2 \ , \ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
294,390 294,100 293,947 293,649 293,429	3 3 1 5 10	22,91 22,87 22,87 22,87 22,87	65,01 65,01 65,05 65,09 65,05	$2p^{4} \stackrel{4}{P} - 3p \stackrel{4}{P}^{\circ} \\ 2p^{4} \stackrel{4}{P} - 3p \stackrel{4}{P}^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2, \\ 3/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
293,123 287,206 286,934 286,688 248,004	15 10 15 15 8	22,79 22,91 22,87 22,79 22,91	65,09 66,08 66,08 66,08 72,9	$2p^{4} {}^{4}P - 3p {}^{4}P^{\circ}$ $2p^{4} {}^{4}P - 3p {}^{4}S^{\circ}$ $2p^{4} {}^{4}P - 3p {}^{4}S^{\circ}$ $2p^{4} {}^{4}P - 3p {}^{4}S^{\circ}$ $2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
247,807 247,422 234,701 234,316 223,605	8 10 25 25	22,87 22,79 7,71 7,71 5,08	72,90 72,90 60,56 60,64 60,56	$2p^4 ^4P - 3s''' ^4S^{\circ} \ 2p^4 ^4P - 3s''' ^4S^{\circ} \ 2p^3 ^2P^{\circ} - 3s ^2P \ 2p^3 ^2P^{\circ} - 3s ^2P \ 2p^3 ^2D^{\circ} - 3s ^2P$	3/2 - 3/2 $5/2 - 3/2$ $3/2$, $1/2 - 1/2$ $3/2$, $1/2 - 3/2$ $3/2 - 1/2$
223 ,241 222 ,600 218 ,766 218 ,643	25 40 5	5,08 7,71 22,91 22,87	60,64 63,44 79,58 79,58	$2p^3 \ ^2D^{\circ} - 3s \ ^2P \ 2p^3 \ ^2P^{\circ} - 3s' \ ^2D \ 2p^4 \ ^4P - 4p \ ^4D^{\circ} \ 2p^4 \ ^4P - 4p \ ^4D^{\circ} \ 2p^4 \ ^4P - 4p \ ^4D^{\circ}$	$\begin{array}{c} 5/_2 - \frac{3}{2} \\ 3/_2 , \begin{array}{c} 1/_2 - \frac{5}{2} \\ 1/_2 - \frac{1}{2} \end{array}, \begin{array}{c} 3/_2 \\ 3/_2 - \frac{1}{2} \\ 1/_2 - \frac{3}{2} \end{array}$
218,483	20	22,91	79,62 79,62	$2p^{4} {}^{4}P - 4p {}^{4}D^{\circ}$	3/2 - 3/2 $3/2 - 5/2$
218,343 218,184 218,131 217,830 217,777	10 20 25	22,87 22,79 22,91 22,79 22,87	79,65 79,62 79,75 79,71 79,80	$2p^4 ^4P - ^4p ^4D^\circ \ 2p^4 ^4P - ^4p ^4P^\circ \ 2p^4 ^4P - ^4p ^4P^\circ \ 2p^4 ^4P - ^4p ^4D^\circ \ 2p^4 ^4P - ^4p ^4P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
,		,	•		9.

λ, Å	I	E _H , eV	E _B , eV	Transition	J
217,640 217,337 215,843 215,711 215,396	15 15 15 3	22,87 22,79 22,91 22,87 22,79	79,84 79,84 80,34 80,34 80,34	$2p^4 ^4P - 4p ^4P^{\circ} \ 2p^4 ^4P - 4p ^4P^{\circ} \ 2p^4 ^4P - 4p ^4S^{\circ} \ 2p^4 ^4P - 4p ^4S^{\circ} \ 2p^4 ^4P - 4p ^4S^{\circ} \ 2p^4 ^4P - 4p ^4S^{\circ}$	$ \begin{array}{c} 3/_2 - 5/_2 \\ 5/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \end{array} $
212,556 208,899 208,734 208,485 204,908	150 80 100 100 5	5,08 0,00 0,00 0,00 22,91	63,44 59,35 59,40 59,47 83,41	$2p^{3} ^{2}D^{\circ} - 3s' ^{2}D$ $2p^{3} ^{4}S^{\circ} - 3s ^{4}P$ $2p^{3} ^{4}S^{\circ} - 3s ^{4}P$ $2p^{3} ^{4}S^{\circ} - 3s ^{4}P$ $2p^{4} ^{4}P - 3d''' ^{4}D^{\circ}$	$^{5/2}$, $^{3/2}_{-}^{-}^{5/2}$, $^{3/2}_{-}^{-}$ $^{3/2}_{-}^{-}^{1/2}$ $^{3/2}_{-}^{-}^{-}^{3/2}$ $^{3/2}_{-}^{-}^{-}^{5/2}$ $^{1/2}_{-}^{-}^{-}^{5/2}$, $^{3/2}$, $^{1/2}$
204,786 204,531 204,270 194,623 194,477	15 25 15 50 40	22,87 22,79 7,71 7,71 7,71	83,41 83,41 68,40 71,41 71,45	$2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$ $2p^{3} {}^{2}P^{\circ} - 3s'' {}^{2}S$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$	$\begin{array}{c} 3/_2 - 5/_2, \ 3/_2, \ 1/_2 \\ 5/_2 - 7/_2, \ 5/_2, \ 3/_2 \\ 3/_2, \ 1/_2 - 1/_2 \\ 3/_2, \ 1/_2 - 3/_2 \\ 3/_2, \ 1/_2 - 1/_2 \end{array}$
194,276 190,645 190,565 186,915 186,787	100 15 25 15 5	7,71 7,71 7,71 5,08 5,08	71,52 72,74 72,76 71,41 71,45	$2p^{3} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
186,575 185,479 183,247 183,165 181,691	$150 \\ 20 \\ 12 \\ 15 \\ 20$	5,08 5,08 5,08 5,08 7,71	71,52 71,92 72,74 72,76 75,96	$2p^{3} {}^{2}D^{\circ} - 3d'' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
181,614 180,402 177,161 176,007 174,920	20 15 80 50 8	7,71 7,71 5,08 5,08 5,08	75,97 76,43 75,06 75,52 75,96	$2p^3 ^2P^{\circ} - 3d' ^2P$ $2p^3 ^2P^{\circ} - 3d' ^2S$ $2p^3 ^2D^{\circ} - 3d' ^2F$ $2p^3 ^2D^{\circ} - 3d' ^2D$ $2p^3 ^2D^{\circ} - 3d' ^2P$	$\begin{array}{c} 3/2 , \ 1/2 - 3/2 \\ 3/2 , \ 1/2 - 1/2 \\ 5/2 , \ 3/2 - 5/2 \\ 5/2 , \ 3/2 - 5/2 , \ 3/2 \\ 3/2 - 1/2 \end{array}$
174,880 174,303 172,620 172,525 172,492	10 3 80 50 40	5,08 7,71 0,00 0,00 0,00	75,97 78,83 71,82 71,86 71,87	$2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$	$\begin{array}{c} {}^{5}/_{2}, \ {}^{3}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2}, \ {}^{1}/_{2} - {}^{1}/_{2} \\ & {}^{3}/_{2} - {}^{5}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2} \\ & {}^{3}/_{2} - {}^{1}/_{2} \end{array}$
168,401 167,921 163,602 163,562 160,471	$\begin{array}{c} 2 \\ 5 \\ 2 \\ 12 \\ 10 \end{array}$	5,08 5,08 7,71 7,71 5,08	78,83 78,91 83,49 83,51 82,34	$2p^3 \ ^2D^{\circ} - 4s \ ^2P$ $2p^3 \ ^2D^{\circ} - 4s \ ^2P$ $2p^3 \ ^2P^{\circ} - 4d \ ^2D$ $2p^3 \ ^2P^{\circ} - 4d \ ^2D$ $2p^3 \ ^2D^{\circ} - 4s' \ ^2D$	$\begin{array}{c} 3/2 - 1/2 \\ 5/2, \ 3/2 - 3/2 \\ 3/2, \ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2, \ 3/2 - 5/2, \ 3/2 \end{array}$
158,822 158,646 158,105 158,063 157,862	15 15 2 5 2	5,08 5,08 5,08 5,08 0,00	83,14 83,22 83,49 83,51 78,54	$2p^3 \ ^2D^{\circ} - 4d^{\ 2}F$ $2p^3 \ ^2D^{\circ} - 4d^{\ 2}F$ $2p^3 \ ^2D^{\circ} - 4d^{\ 2}D$ $2p^3 \ ^2D - 4d^{\ 2}D$ $2p^3 \ ^4S^{\circ} - 4s^{\ 4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
157,781 157,626 156,873 156,480 154,488	3 5 3 5 5	0,00 0,00 7,71 7,71 7,71	78,58 78,65 86,74 86,94 87,96	$2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4d'' {}^{2}D$	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 , 1/2 - 5/2 , 3/2 \\ 3/2 , 1/2 - 3/2 , 1/2 \\ 3/2 , 1/2 - 5/2 , 3/2 \end{array}$
152,231 151,817 150,931 149,589 148,942	15 15 1 2 4	5,08 5,08 7,71 5,08 0,00	86,52 86,74 89,85 87,96 83,24	$2p^3 \ ^2D^{\circ}$ $-4d' \ ^2F$ $2p^3 \ ^2D^{\circ}$ $-4d' \ ^2D$ $2p^3 \ ^2P^{\circ}$ $-5s' \ ^2D$ $2p^3 \ ^2D^{\circ}$ $-4d'' \ ^2D$ $2p^3 \ ^4S^{\circ}$ $-4d \ ^4P$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
148,787 148,660 146,262	3 1 2	0,00 0,00 5,08	83,33 83,40 89,85	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 5s' {}^{2}D$	3/2 - 3/2 $3/2 - 1/2$ $5/2$, $3/2 - 5/2$, $3/2$

λ, Å	I	E _H , eV	$E_{ m B}$, eV	Transition	J
144,288 144,151	1 2	0,00 0,00	85 ,93 86 ,01	$2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
144,019 142,929 140,127	$\begin{array}{c}2\\3\\3\end{array}$	0,00 5,08 5,08	86,08 91,82 93,55	$2p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 5d' {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 6s' {}^{2}D$	3/2— $5/25/2$, $3/2$ — $7/2$, $5/25/2$, $3/2$ — $5/2$, $3/2$

Ne V, ground state $1s^2 2s^2 2p^{2\,3}P_0$ Ionization potential $1\,018\,634~{\rm cm}^{-1};~126,287~{\rm eV}$

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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2306,31 2282,61 2274,54 2265,71 2263,39	2 1 0 6 3	74,08 73,97 86,60 74,08 73,92	79,45 79,40 92,05 79,55 79,40	$3s ^3P^{\circ} - 3p ^3D$ $3s ^3P^{\circ} - 3p ^3D$ $3s ^5P - 3p ^5D^{\circ}$ $3s ^3P^{\circ} - 3p ^3D$ $3s ^3P^{\circ} - 3p ^3D$	2-2 1-1 3-2 2-3 0-1
2259,57 2256,05 2245,48 2236,29 2232,41	3 1 3 2 4	73,97 86,60 86,53 86,47 86,60	79,45 92,09 92,05 92,02 92,15	$3s ^3P^{\circ} - 3p ^3D$ $3s ^5P - 3p ^5D^{\circ}$ $3s ^5P - 3p ^5D^{\circ}$ $3s ^5P - 3p ^5D^{\circ}$ $3s ^5p - 3p ^5D^{\circ}$	1-2 3-3 2-2 1-1 3-4
2227, 42 2224, 12 572, 336 572, 106 569, 830	3 1 80 25 50	86,53 86,47 0,14 0,14 0,05	92,09 92,05 21,80 21,81 21,81	$3s ^5p - 3p ^5D^{\circ} \ 3s ^5P - 3p ^5D^{\circ} \ 2p^2 ^3P - 2p^3 ^3D^{\circ} \ 2p^2 ^3P - 2p^3 ^3D^{\circ} \ 2p^2 ^3P - 2p^3 ^3D^{\circ}$	23 12 23 22 12
569,759 568,418 487,070 482,987 481,361	$25 \\ 40 \\ 3 \\ 50 \\ 25$	$egin{array}{c} 0,05 \\ 0,00 \\ 25,81 \\ 0,14 \\ 0,05 \\ \end{array}$	21,81 21,81 51,26 25,81 25,81	$2p^2$ 3P $-2p^3$ $^3D^\circ$ $2p^2$ 3P $-2p^3$ $^3D^\circ$ $2p^3$ $^3P^\circ$ $-2p$ 4 3P $2p^2$ 3P $-2p^3$ $^3P^\circ$ $2p^2$ 3P $-2p^3$ $^3P^\circ$	$\begin{array}{c} 1-1 \\ 0-1 \\ 2, 1-1 \\ 2-2, 1 \\ 1-2, 1 \end{array}$
481,281 480,406 422,347 422,214 420,951	15 25 5 15 15	0,05 0,00 21,81 21,80 21,81	25,81 25,81 51,16 51,16 51,26	$2p^2 ^3P - 2p^3 ^3P^\circ \ 2p^2 ^3P - 2p^3 ^3P^\circ \ 2p^3 ^3D^\circ - 2p^4 ^3P \ 2p^3 ^3D^\circ - 2p^4 ^3P \ 2p^3 ^3D^\circ - 2p^4 ^3P$	$ \begin{array}{c} 1-0\\ 0-1\\ 2, 1-2\\ 3-2\\ 2, 1-1 \end{array} $
420,386 416,834 416,198 365,594 359,385	10 25 80 100 50	21,81 7,92 3,76 3,76 0,14	51,30 37,67 33,54 37,67 34,63	$2p^3 ^3D^{\circ} - 2p^4 ^3P$ $2p^2 ^1S - 2p^3 ^1P^{\circ}$ $2p^2 ^1D - 2p^3 ^1D^{\circ}$ $2p^2 ^1D - 2p^3 ^1P^{\circ}$ $2p^2 ^3P - 2p^3 ^3S^{\circ}$	1—0 0—1 2—2 2—1 2—1
358,472 357,955 195,621 195,553 195,368	50 40 2 3 5	0,05 0,00 25,81 25,81 25,81	34,63 34,63 89,48 89,20 89,26	$\begin{array}{c} 2p^2 ^3P - 2p^3 ^3S^\circ \\ 2p^2 ^3P - 2p^3 ^3S^\circ \\ 2p^3 ^3P^\circ - 3s ^3P \\ 2p^3 ^3P^\circ - 3s ^3P \\ 2p^3 ^3P^\circ - 3s ^3P \end{array}$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 1-0 \\ 2, 1-1 \\ 2, 1-2 \end{array} $
184,730 173,932 167,921 167,837	10 50 5 5 5	7,92 3,76 0,14 0,05 0,14	75,03 75,03 73,97 73,92 74,08	$2p^{2} {}^{1}S - 3s {}^{1}P^{\circ} \ 2p^{2} {}^{1}D - 3s {}^{1}P^{\circ} \ 2p^{2} {}^{3}P - 3s {}^{3}P^{\circ} \ 2p^{2} {}^{3}P - 3p^{2} {}^{3}P - 3p^{2}P $	0—1 2—1 2—1 1—0 2—2
167,610 167,483 164,294	3 15 8	0,05 0,00 0,05 11,01	73,97 73,97 74,08 86,47	$2p^{3} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{2} {}^{3}P - 3s {}^{3}P^{\circ}$ $2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 2 - 1 \end{array} $

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
164 ,145 164 ,023	10 10	11,01 11,01	86,53 86,60	$2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 3s {}^{5}P$	2—2 2—3
156,610 151,424 148,787 147,132	$egin{pmatrix} 2 \\ 12 \\ 3 \\ 15 \end{bmatrix}$	7,92 3,76 3,76 3,76	87,08 85,63 87,08 88,02	$2p^{2} {}^{1}S - 3d {}^{1}P^{\circ}$ $2p^{2} {}^{1}D - 3d {}^{1}D^{\circ}$ $2p^{2} {}^{1}D - 3d {}^{1}P^{\circ}$ $2p^{2} {}^{1}D - 3d {}^{1}F^{\circ}$	0-1 $2-2$ $2-1$ $2-3$
143,344 143,273 143,219 142,724	15 10 5 15	0,14 0,05 0,00 0,14	86,63 86,58 86,56 87,00	$2p^2$ 3P $-3d$ $^3D^\circ$ $2p^2$ 3P $-3d$ $^3D^\circ$ $2p^2$ 3P $-3d$ $^3D^\circ$ $2p^2$ 3P $-3d$ $^3P^\circ$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 0 - 1 \\ 2 - 2 \end{array} $
$142,661 \\ 142,503$	4 1 0	$\substack{0,14\\0,05}$	87,04 87,04	$\frac{2p^2}{2p^2}$ 3P — $3d$ 3P ° 3P — 3d 3P °	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
142,441 140,791 140,757 140,716 136,215	10 15 15 5 2	0,05 11,01 11,01 11,01 11,01	87,09 99,07 99,09 99,12 102,03	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$ $2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 4s^{5}P$	$ \begin{array}{c} 1-0 \\ 2-3 \\ 2-2 \\ 2-1 \\ 2-3, 2, 4 \end{array} $
129,034 128,793 125,830 123,712 122,520	5 1 2 3 20	3,76 11,01 0,05 3,76 3,76	99,84 107,28 98,60 103,97 105,03	$2p^{2} ^{1}D$ — $4s ^{1}P^{\circ}$ $2p^{3} ^{5}S^{\circ}$ — $4d ^{5}P$ $2p^{2} ^{3}P$ — $4s ^{3}P^{\circ}$ $2p^{2} ^{1}D$ — $4d ^{1}D^{\circ}$ $2p^{2} ^{1}D$ — $4d ^{1}F$	$\begin{smallmatrix} 2-1 \\ 2-3 & 2 & 1 \\ 2-3 & 2 & 1 \\ 0-2 & 1 & 0 \\ 2-2 & 2-3 \end{smallmatrix}$
118,841 118,715	1 5	0,05 0,05	104,39 104,50	$\frac{2p^2}{2p^2} \frac{^3P}{^3P} - 4d \frac{^3D}{^3P} \circ 2p^2 \frac{^3P}{^3P} - 4d \frac{^3P}{^3P} \circ$	2, 1, 0-3, 2, 1 2, 1, 0-2, 1, 0

Ne VI, ground state $1s^2 2s^2 2p^2 P_{1/2}^0$ Ionization potential 1 274 000 cm $^{-1}$; 157,94 eV

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λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
2289,36 2253,22 2247,76 2055,93 2042,382	1 3 1 3 3	103,70 103,70 103,60 89,59 89,59	109,11 109,20 109,11 95,62 95,66	$3s {}^{4}P^{\circ} - 3p {}^{4}D$ $3s {}^{2}S - 3p {}^{2}P^{\circ}$ $3s {}^{2}S - 3p {}^{2}P^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
562,805 562,735 558,595 454,072 452,745	15 1 5 3 3	0,16 $0,16$ $0,00$ $12,60$ $12,52$	22,19 22,19 22,19 39,90 39,90	$2p^{2}P^{\circ}-2p^{2}^{2}D$ $2p^{2}P^{\circ}-2p^{2}^{2}D$ $2p^{2}P^{\circ}-2p^{2}^{2}D$ $2p^{2}P^{\circ}-2p^{2}^{2}D$ $2p^{2}^{4}P-2p^{3}^{4}S^{\circ}$ $2p^{2}^{4}P-2p^{3}^{4}S^{\circ}$	$\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{3}{2}$
451,843 440,60 440,404 435,649 433,176	2 0 1 4 4	12,46 22,19 22,19 0,16 0,00	39,90 50,33 50,34 28,62 28,62	$2p^{2} {}^{4}P - 2p^{3} {}^{4}S^{\circ} \ 2p^{2} {}^{2}D - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}D - 2p^{3} {}^{2}P^{\circ} \ 2p^{2} {}^{2}D - 2p^{2} {}^{2}S \ 2p {}^{2}P^{\circ} - 2p^{2} {}^{2}S$	$\begin{array}{c} {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{5}/_{2} , \ {}^{3}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \end{array}$
403,262 401,939 401,138 399,820 194,936	10 25 15 5 2	0,16 0,16 0,00 0,00 31,01	30,91 31,01 30,91 31,01 95,62	$\begin{array}{c} 2p\ ^{2}P^{\circ}-2p^{2}\ ^{2}P \\ 2p\ ^{2}P^{\circ}-2p^{2}\ ^{2}P \\ 2p\ ^{2}P^{\circ}-2p^{2}\ ^{2}P \\ 2p\ ^{2}P^{\circ}-2p^{2}\ ^{2}P \\ 2p\ ^{2}P^{\circ}-2p^{2}\ ^{2}P \end{array}$	3/2 - 1/2 $3/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 1/2$
194,839 188,424 171,212 171,114 138,630	2 3 2 5 3	31,01 28,62 22,19 22,19 0,16	95,66 95,66 95,62 95,66 89,59	$2p^{2} {}^{2}P - 3p {}^{2}P^{\circ} \ 2p^{2} {}^{2}S - 3p {}^{2}P^{\circ} \ 2p^{2} {}^{2}J - 3p^{2}P^{\circ} \ 2p^{2} {}^{2}J - 3p {}^{2}P^{\circ} \ 2p^{2} {}^{2}D - 3s {}^{2}S$	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 5/_{2}, \ \frac{3}{2} - \frac{3}{2} \\ 3/_{2} - 1/_{2} \\ \end{array}$

λ, Å	I	E _H , eV	$E_{\mathbf{B}}$, eV	Transition	J
138,397	3	0,00	89,59	$2p^{2}P^{\circ}-3s^{2}S$	1/2-1/2
136,089 122,686	$\frac{4}{10}$	$\begin{array}{c} 12,60 \\ 0,16 \end{array}$	103,70 101,22	$2p^{2} P - 3s^{4}P$ $2p^{2}P^{\circ} - 3d^{2}D$	$^{5/2}_{3/2}$ $^{5/2}_{5/2}$, $^{3/2}_{3/2}$
122,520	20	0,00	101,22	$2p^{-2}P^{\circ}-3d^{-2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
121,140	5	12,60	114,65	$2p^2 ^4P - 3d ^4D^{\circ}$	5/2—7/2, 5/2, 3/
113,870 111,142	5 1	$00,00 \\ 00,0$	108,96 111,63	$\frac{2p}{2p} ^{2}P^{\circ} - 3p ^{2}P$ $\frac{2p}{2p} ^{2}P^{\circ} - 3p ^{2}S$	$\frac{3}{2}, \frac{1}{2} - \frac{3}{2}, \frac{1}{2}$ $\frac{3}{2}, \frac{1}{2} - \frac{1}{2}$
110,410	$\overset{1}{2}$	0,00	111,65	2p P - 3p S $2p ^{2}P^{\circ} - 3p ^{2}D$	3/2, $1/2$ $3/2$, $5/2$

Ne VII, ground state $1s^2 2s^{2-1}S_0$

λ, Å	I	E_{H} , eV	$E_{\rm B}$, eV	Transition	J
1997,345 1992,060 1981,974 564,529 562,992	1 3 6 2 2	121,27 121,27 121,27 13,97 13,85	127,49 127,51 127,54 35,93 35,87	$3s {}^{3}S - 3p {}^{3}P^{\circ}$ $3s {}^{3}S - 3p {}^{3}P^{\circ}$ $3s {}^{3}S - 3p {}^{3}P^{\circ}$ $2p {}^{3}P^{\circ} - 2p^{2} {}^{3}P$ $2p {}^{3}P^{\circ} - 2p^{2} {}^{3}P$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 2 - 1 \\ 1 - 0 \end{array} $
561,728 561,378 559,947 558,61 465,21	4 2 3 4 10	13,97 13,85 13,79 13,85 0,00	36,04 35,93 35,93 36,04 26,65	$2p \ ^{3}P^{\circ}-2p^{2} \ ^{3}P$ $2s^{2} \ ^{1}S-2p \ ^{1}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 0-1 \\ 1-2 \\ 0-1 \end{array} $
127,7 116,7 115,5 115,4 106,2	2 5 3 7	_ _ _ _	_ _ _ _	$2p {}^{1}P^{\circ} - 3s {}^{1}S$ $2p {}^{1}P^{\circ} - 3d {}^{1}D$ $2p {}^{3}P^{\circ} - 3s {}^{3}S$ $2p {}^{3}P^{\circ} - 3s {}^{3}S$ $2p {}^{3}P^{\circ} - 3d {}^{3}D$	_ _ _ _
106,1 97,5 89,4 82,3	7 6 3 5	 - -	_ _ _ _	$2p ^3P^{\circ} - 3d ^3D$ $2s^2 ^1S - 3p ^1P^{\circ}$ $2p ^1P^{\circ} - 4d ^1D$ $2p ^3P^{\circ} - 4d ^3D$	_ _ _ _

Ne VIII, ground state $1s^2 2s {}^2S_{1/2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
780,324	4	0,00	15,87	$2s^{2}S-2p^{2}P^{\circ}$	1/2-1/2
770,409	8	00,00	16,09	$2s^{2}S - 2p^{2}P^{\circ}$	$^{1}/_{2}$ _3 $/_{2}$
103,1 102,9	$\frac{6}{5}$	_	_	$2p {}^{2}P^{\circ} - 3s {}^{2}S 2p {}^{2}P^{\circ} - 3s {}^{2}S$	<u>-</u>
98,2	9	_	_	$2p^{-1}P^{\circ} - 3d^{-2}D$	_
98,1	9	_		$2p ^{2}P^{\circ} - 3d ^{2}D$	_
88,1	9	_	_	$2s {}^{2}S - 3p {}^{2}P^{\circ}$	-
74,7	4	-	_	$2p ^{2}P^{\circ}$ — $4s ^{2}S$	-
73,6	8	_		$2p^{2}P^{\circ}-4d^{2}D$	_
67,3	8	_		$2s {}^2S$ — $4p {}^2P$ °	_
65,9	6	_		$2p$ 2P °— $5d$ 2D	_
62,4	3	_	_	$2p^{-2}P^{\circ}$ — $6d^{-2}D$	
60,7	3	_		2 2 2 S $-5p$ 2 P $^{\circ}$	

Unclassified Lines of Neon [4, 5, 6, 12, 20]

λ, Å	I	Expected assignment	λ, Å	I	Expected assignment
9760 ,57 9497 ,9 9393 ,8 9368 ,02 9326 ,66	2 2 2 2 2 2	Ne I Ne I Ne I Ne I Ne I	2706,74 2686,75 2685,58 2685,33 2677,36	1 3 1 1 3	Ne I Ne I Ne I Ne I Ne I
9069 ,7 9045 ,4 8842 ,1 7125 ,37 4517 ,29	2 2 2 3 2	Ne I Ne I Ne I Ne I Ne II	2669,36 2663,38 2651,01 2645,51 2621,10	1,5 2 6 6 2	Ne I Ne I Ne I Ne I Ne I
3786 ,29 3783 ,92 3782 ,31 3771 ,64 3740 ,60	2 1 1 1	Ne III or Ne IV Ne II	2619,77 2619,02 2595,21 2507,08 2367,02	1 1,5 6 1 5	Ne I Ne I Ne III or Ne IV Ne III or Ne IV
3454,83 3267,22 3265,37 3260,87 3250,34	1 1 3 3 1	Ne III Ne III or Ne IV Ne III or Ne IV Ne III or Ne IV Ne II	2365 ,77 2362 ,85 2307 ,27 2306 ,61 2305 ,50	6 5 2 6 2	Ne III or Ne IV
3238,47 3207,906 3101,407 3081,45 3067,214	1 2,5 2 1 4	Ne III or Ne IV Ne I Ne I Ne II Ne I	2304,87 2303,94 2300,38 2298,96 2278,98	4 3 2 1 10	Ne III or Ne IV
3065,668 3062,58 3043,02 3028,424 3026,913	1,5 2 2 1 3	Ne I Ne II Ne III or Ne IV Ne I Ne I	2273,58 2204,16 2203,89 2200,82 2192,74	$20 \\ 2 \\ 6 \\ 5 \\ 7$	Ne III or Ne IV
3024,63 3007,82 2983,82 2974,527 2910,44	2 1 5 1 2	Ne III or Ne IV Ne II Ne III or Ne IV Ne I Ne II	2191,45 2191,16 2186,62 2129,54 2124,27	1 4 3 6 7	Ne III or Ne IV
2905,85 2895,05 2893,11 2866,65 2827,98	4 1 1 5 0	Ne III or Ne IV	2102,33 2099,59 2099,34 2098,00 2097,43	2 4 10 1 2	Ne III or Ne IV
2821,68 2820,44 2818,88 2798,96 2781,42	0 0 1 0	Ne III or Ne IV Ne I	2096,23 2094,15 2093,64 2091,90 2089,20	12 2 3 4 2	Ne III or Ne IV
2767,00 2766,07 2764,70 2764,38 2713,76	7 6 2 1 1	Ne II or Ne III Ne III or Ne IV Ne III or Ne IV Ne III or Ne IV	2085,56 2078,95 2065,18 2062,62	5 15 20 2	Ne III or Ne IV

Na I, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 S_{1/2}$ Ionization potential 41 449,65 cm⁻¹; 5,139 eV

	i poten	liai 414	43,00 CH	1 -, 0,100 64	
λ, Å	I	$E_{ m H}^{},~{ m eV}$	EB, eV	Transition	J
90850 90480 74430 40449 23379,13	40 30 10 . 80 240				
23348,41 22083,67 22056,44 18465,25 16388,85	237 276 300 2 27	3,75 3,19 3,19 3,62 3,75	4,28 3,75 3,75 4,29 4,51	$4p\ ^{2}P^{\circ}-4d\ ^{2}D$ $4s\ ^{2}S-4p\ ^{2}P^{\circ}$ $4s\ ^{2}S-4p\ ^{2}P^{\circ}$ $3d\ ^{2}D-4f\ ^{2}F^{\circ}$ $4p\ ^{2}P^{\circ}-6s\ ^{2}S$	$^{1/2}_{1/2}^{-3/2}_{1/2}^{-1/2}_{1/2}^{-3/2}_{3/2}, ^{5/2}_{5/2}^{-5/2}_{-5/2}, ^{7/2}_{2}$
16373,85 14779,73 14767,48 12679,17 11403,78	30 36 1155 83 12	3,75 3,75 3,75 3,62 2,10	4,51 4,59 4,59 4,59 3,19	$4p ^{2}P^{\circ} - 6s ^{2}S$ $4p ^{2}P^{\circ} - 5d ^{2}D$ $4p ^{2}P^{\circ} - 5d ^{2}D$ $3d ^{2}D - 5f ^{2}F^{\circ}$ $3p ^{2}P^{\circ} - 4s ^{2}S$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2, 5/2 - 5/2, 7/2 \\ 3/2 - 1/2 \end{array} $
11381,45 11197,21 11190,19 10834,87 10749,29	11 2 1 8 9	2,10 3,75 3,75 3,62 3,19	3,19 4,86 4,86 4,76 4,34	$3p ^{2}P^{\circ}-4s ^{2}S$ $4p ^{2}P^{\circ}-7d ^{2}D$ $4p ^{2}P^{\circ}-7d ^{2}D$ $3d ^{2}D-6f ^{2}F^{\circ}$ $4s ^{2}S-5p ^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2, 5/2 - 5/2, 7/2 \\ 1/2 - 1/2 \end{array} $
10746,44 10572,28 10566,00 9961,281 9465,938	10 3 1 7 6	3,19 3,75 3,75 3,62 3,62	4,34 4,93 4,93 4,86 4,93	4s ² S-5p ² P° 4p ² P°-8d ² D 4p ² P°-8d ² D 3d ² D-7f ² F° 3d ² D-8f ² F°	$\begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 , \ 5/_2 - 5/_2 , \ 7/_2 \\ 3/_2 , \ 5/_2 - 5/_2 , \ 7/_2 \end{array}$
9153,878 8942,962 8650,889 8649,922 8194,8237	4 2 6 7 9	3,62 3,62 3,19 3,19 2,10	4,97 5,00 4,62 4,62 3,62	3d ² D—9f ² F° 3d ² D—10f ² F° 4s ² S—6p ² P° 4s ² S—6p ² P° 3p ² P°—3d ² D	$\begin{array}{c} 3/_{2}, & 5/_{2} - 5/_{2}, & 7/_{2} \\ 3/_{2}, & 5/_{2} - 5/_{2}, & 7/_{2} \\ & 1/_{2} - 1/_{2} \\ & 1/_{2} - 3/_{2} \\ & 3/_{2} - 5/_{2} \end{array}$
8194,7905 8183,2556 7810,237 7809,781 7373,491	1 5 3 4 1	2,10 2,10 3,19 3,19 3,19	3,62 3,62 4,78 4,78 4,87	$3p \ ^{2}P^{\circ}$ $-3d \ ^{2}D$ $3p \ ^{2}P^{\circ}$ $-3d \ ^{2}D$ $4s \ ^{2}S$ $-7p \ ^{2}P^{\circ}$ $4s \ ^{2}S$ $-7p \ ^{2}P^{\circ}$ $4s \ ^{2}S$ $-8p \ ^{2}P^{\circ}$	3/2 - 3/2 $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$ $1/2 - 1/2$
7373,229 6160,7470 6154,2253 5895,9236 5889,9504	2 1 16 32	3,19 2,10 2,10 0,00 0,00	4,87 4,12 4,12 2,10 2,10	$\begin{array}{c} 4s ^2S - 8p ^2P^{\circ} \\ 3p ^2P^{\circ} - 5s ^2S \\ 3p ^2P^{\circ} - 5s ^2S \\ 3s ^2S - 3p ^2P^{\circ} \\ 3s ^2S - 3p ^2P^{\circ} \end{array}$	$1/_{2}$ $3/_{2}$ $3/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$
5688,2046 5688,1934 5682,6333 5669,8 5532,0	9 1 5 3 2	2,10 2,10 2,10 2,10	4,28 4,28 4,28 4,29	$3p ^{2}P^{\circ}$ — $4d ^{2}D$ $3p ^{2}P^{\circ}$ — $4d ^{2}D$ $3p ^{2}P^{\circ}$ — $4d ^{2}D$ $3p ^{2}P^{\circ}$ — $4f ^{2}F^{\circ}$ —	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $
5153,4024 5148,8381 4982,8134 4978,5414 4751,8218	2 1 2 1 2	2,10 2,10 2,10 2,10 2,10 2,10	4,51 4,51 4,59 4,59 4,71	$3p ^{2}P^{\circ} - 6s ^{2}S$ $3p ^{2}P^{\circ} - 6s ^{2}S$ $3p ^{2}P^{\circ} - 5d ^{2}D$ $3p ^{2}P^{\circ} - 5d ^{2}D$ $3p ^{2}P^{\circ} - 7s ^{2}S$	3/2 - 1/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$
4747,9410 4668,5595 4664,8107	1 2 1	2,10 2,10 2,10	4,71 4,76 4,76	3p ² P°—7s ² S 3p ² P°—6d ² D 3p ² P°—6d ² D	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $

λ, Å	I	$E_{ m H},$ eV	$E_{ m B}$, eV	Transition	J
4545,186 4541,633	8 7	2,10 2,10	4,83 4,83	3p ² P°—8s ² S 3p ² P°—8s ² S	$^{3/2}_{1/2}$ $^{1/2}_{1/2}$
4497,658 4494,177 4423,246 4419,885 4393,340	11 10 7 6 9	2,10 2,10 2,10 2,10 2,10 2,10	4,86 4,86 4,91 4,91 4,93	$3p ^{2}P^{\circ}$ — $7d ^{2}D$ $3p ^{2}P^{\circ}$ — $7d ^{2}D$ $3p ^{2}P^{\circ}$ — $9s ^{2}S$ $3p ^{2}P^{\circ}$ — $9s ^{2}S$ $3p ^{2}P^{\circ}$ — $8d ^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
4390,029 4344,736 4341,489 4324,615 4321,400	8 5 4 7 6	2,10 2,10 2,10 2,10 2,10 2,10	4,93 4,96 4,96 4,97 4,97	$3p ^{2}P^{\circ}$ — $8d ^{2}D$ $3p ^{2}P^{\circ}$ — $10s ^{2}S$ $3p ^{2}P^{\circ}$ — $10s ^{2}S$ $3p ^{2}P^{\circ}$ — $9d ^{2}D$ $3p ^{2}P^{\circ}$ — $9d ^{2}D$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
4291,006 4287,838 4276,787 4273,642 4252,520	3 2 5 4 2	2,10 2,10 2,10 2,10 2,10 2,10	4,99 4,99 5,00 5,00 5,02	$3p ^{2}P^{\circ}$ —11s ^{2}S $3p ^{2}P^{\circ}$ —11s ^{2}S $3p ^{2}P^{\circ}$ —10d ^{2}D $3p ^{2}P^{\circ}$ —10d ^{2}D $3p ^{2}P^{\circ}$ —12s ^{2}S	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
4249,410 4242,082 4238,987 4198,3 3426,862	$\begin{array}{c} 1 \\ 3 \\ 2 \\ 10 \\ 6 \end{array}$	2,10 2,10 2,10 - 0,00	5,02 5,03 5,03 — 3,62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ - 1/2 - 3/2 \end{array} $
3302,979 3302,369 2893,618 2853,013 2852,811	18 19 1 15 16	0,00 0,00 0,00 0,00 0,00	3,75 3,75 4,28 4,34 4,34	3s ² S-4p ² P° 3s ² S-4p ² P° 3s ² S-4d ² D 3s ² S-5p ² P° 3s ² S-5p ² P°	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
2680,433 2680,340 2593,919 2593,869 2543,872	7 8, 2 3 2	0,00 0,00 0,00 0,00 0,00	4,62 4,62 4,78 4,78 4,87	3s ² S-6p ² P° 3s ² S-6p ² P° 3s ² S-7p ² P° 3s ² S-7p ² P° 3s ² S-8p ² P°	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
2543,841 2512,210 2512,128 2490,733	1 4 2 3	00,00 0,00 0,00 0,00	4,87 4,93 4,93 4,98	$3s {}^{2}S - 8p {}^{2}P^{\circ} \ 3s {}^{2}S - 9p {}^{2}P^{\circ} \ 3s {}^{2}S - 9p {}^{2}P^{\circ} \ 3s {}^{2}S - 10p {}^{2}P^{\circ}$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ \end{array}$

Na II, ground state $1s^2 \ 2s^2 \ 2p^6 \ ^1S_0$ Ionization potential $381\ 528\ {\rm cm^{-1}};\ 47,30\ {\rm eV}$

$\begin{array}{cccccccccccccccccccccccccccccccccccc$	λ, Å	I	$E_{ m H}^{}$, eV	$E_{ m B}$, eV	Transition	J
$3318,032$ 4 $37,26$ 40,99 $3p'[1/2] - 3d[1/2]^{\circ}$ 1-1 $3304,950$ 0 $37,24$ 40,99 $3p[1/2] - 3d[1/2]^{\circ}$ 0-1	4114,95 4087,60 3711,074 3631,266 3533,043 3462,494 3400,110	3 0 6 8 10 3 2	38,29 33,32 33,01 32,94 32,84 33,32 33,32	41,31 36,35 36,35 36,35 36,35 36,90 36,97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 $1-1$ $0-1$ $1-1$ $2-1$ $1-2$ $1-1$
3301,340 2 $37,20$ $41,01$ $3p$ $[7/2]=3a$ $[17/2]$ $1-2$ $3285,603$ 8 $33,32$ $37,09$ $3s'$ $[1/2]$ ° $-3p$ $[11/2]$ $1-2$	3318,032 3304,950 3301,346	4 0 2	37,26 37,24 37,26	40,99 40,99 41,01	$3p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ}$ $3p \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ}$ $3p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ}$	1—1 0—1 1—2

λ, λ	I	E _H , eV	E _B , eV	Transition	J
3274,220 3260,218	5 3	37 ,21 37 ,17	40,99 40,98	$3p' [1^{1}/_{2}] - 3d [^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}] - 3d [^{1}/_{2}]^{\circ}$	$\begin{array}{c} 2-1 \\ 1-0 \end{array}$
3257 ,965 3250 ,949 3234 ,926	$\begin{matrix} 6 \\ 3 \\ 4 \end{matrix}$	37,21 37,17 37,17	41,01 40,99 41,01	$3p' [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$	2-2 1-1 1-2
3225,976 3216,284	4 2	37,26 37,21	41 ,10 41 ,06	$3p' [1/2] - 4s [11/2]^{\circ}$ $3p' [11/2] - 3d [31/2]^{\circ}$	1—2 2—3
3212,186 3189,783 3179,055 3175,008 3167,487	6 6 5 3 2	33,32 37,32 37,09 37,24 37,21	37,17 37,21 40,99 41,15 41,12	$3s' [1/2]^{\circ} - 3p' [1^{1}/2]$ $3s' [1/2]^{\circ} - 3p' [1^{1}/2]$ $3p [1^{1}/2] - 3d [1^{1}/2]^{\circ}$ $3p [1/2] - 4s [1^{1}/2]^{\circ}$ $3p' [1^{1}/2] - 3d [2^{1}/2]^{\circ}$	$egin{array}{c} 1-1 \\ 1-2 \\ 2-1 \\ 0-1 \\ 2-2 \end{array}$
3163,731 3163,247 3161,16 3159,53 3149,266	6 1 0 0 5	37,09 37,21 33,32 37,21 33,32	41,01 41,12 37,24 41,13 37,26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-0 \\ 2-1 \\ 1-1 \end{array} $
3145,697 3137,852 3135,483 3129,368 3125,208	3 3 5 6 1	37,17 37,17 33,01 32,94 37,17	41,12 41,13 36,97 36,90 41,15	$3p' [1^{1}/_{2}] - 3d [2^{1}/_{2}]^{\circ}$ $3p' [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$ $3s' [1^{1}/_{2}]^{\circ} - 3p [1^{1}/_{2}]$ $3s [1^{1}/_{2}]^{\circ} - 3p [2^{1}/_{2}]$ $3p' [1^{1}/_{2}] - 4s [1^{1}/_{2}]^{\circ}$	1-2 $1-1$ $0-1$ $1-2$ $1-1$
3124,414 3104,396 3092,729 3087,047 3080,250	$\begin{array}{c} 3 \\ 4 \\ 10 \\ 2 \\ 3 \end{array}$	37,09 37,26 32,84 36,97 37,26	41,06 41,25 36,85 40,98 41,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2 - 3 \\ 4 - 0 \\ 2 - 3 \\ 4 - 0 \\ 1 - 2 \end{array} $
3078,733 3078,315	1 6	36,97 $32,94$	40,99 36,97	$3p \ [1^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ}$ $3s \ [^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}]$ $3p \ [^{1}/_{2}] - 3d \ [^{2}/_{2}]^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 2 - 2 \end{array} $
3074,334 3070,84 3066,536	$\begin{matrix} 6 \\ 0 \\ 4 \end{matrix}$	37,09 37,09 37,09 37,26	41 ,12 41 ,12 41 ,13 41 ,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 2—1 1—1
3066,238 3064,372 3061,333 3060,260	1 4 1 1	36,97 37,26	41 ,01 41 ,31	$3p [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$ $3p' [^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ}$	1—2 1—1 —
3058,727 3056,157 3055,346 3053,664	1 6 1 6	37,09 32,84 37,24 37,21	41 ,15 36 ,90 41 ,30 41 ,27	$3p [1^{1}/_{2}]-4s [1^{1}/_{2}]^{\circ}$ $3s [1^{1}/_{2}]^{\circ}-3p [2^{1}/_{2}]$ $3p [1/_{2}]-4s' [1/_{2}]^{\circ}$ $3p' [1^{1}/_{2}]-3d' [2^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 0-1 \\ 2-3 \end{array} $
3050,211 3045,593 3037,071	1 5 5	37,17 37,17	 41 ,25 41 ,26	$\begin{array}{c} - \\ 3p' \ [1^{1}/_{2}] - 4s' \ [^{1}/_{2}]^{\circ} \\ 3p' \ [1^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \end{array}$	1—0 1—2
3029,068 3015,400 3009,138	$\frac{6}{4}$	{ 37,21 36,90 36,90 37,17	41,30 40,99 41,01 41,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 2—1 2—2 1—1 2—1
3007,442 2984,183	4 7	$32,85$ $\begin{cases} 32,94\\ 36,97 \end{cases}$	36,97 37,09 41,12	3s [1/2] - 3p [1/2] $3s [1/2]^{\circ} - 3p [1/2]$ $3p [1/2] - 3d [2/2]^{\circ}$	$ \begin{array}{c} 2 - 1 \\ 1 - 2 \\ 1 - 2 \end{array} $
2980,622 2979,662	3 5	36,85 36,90	41,01 41,06	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3—2 2—3 —
2979,050 2977,132 2974,991	$egin{array}{c} 2 \\ 3 \\ 6 \end{array}$	36,97 33,01	41,13 37,17	$\begin{array}{c} - \\ 3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \end{array}$	
2974,336 2970,725 2965,750 2960,112	2 1 2 1	37,09 37,09 36,97 37,09	41 ,26 41 ,27 41 ,15 41 ,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1 2-3 1-1 2-2

	_				
λ, Å	I	$E_{ m H}^{},$ eV	$E_{_{ m B}}$, eV	Transition	J
2952,395 2951,231 2947,441 2945,695 2937,725	3 8 5 4 5	36,85 36,85 37,09 36,85 36,90	41,10 41,05 41,30 41,06 41,12	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2 3-4 2-1 3-3 2-2
2934,065 2930,883 2923,474 2920,940 2919,845	2 1 3 4 2	36,90 36,90 32,94 33,01 36,90	41,12 41,13 37,17 37,26 41,15	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 3d \ [4^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p \ [2^{1}/_{2}] - 4s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 2 - 1 \\ 1 - 1 \\ 0 - 1 \\ 2 - 1 \end{array} $
2919,048 2917,516 2904,914 2901,136 2893,946	5 7 4 6	36,85 32,84 32,94 36,85 36,97	41,10 37,09 37,21 41,12 41,25	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 4s \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 4s' \ [^{1}/_{2}]^{\circ} \end{array}$	3-2 2-2 1-2 3-3 1-0
2886,250 2881,140 2872,95 2871,270 2861,011	4 6 0 5 1	36,97 32,94 36,97 32,94 36,97	41,26 37,24 41,28 37,26 41,30	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 1-2 \\ 1-1 \\ 1-1 \end{array} $
2859,481 2841,721 2839,555 2829,854 2818,271	5 7 4 2 2	32,84 32,84 36,90 36,90 36,90	37,18 37,21 41,27 41,28 41,30	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3p \ [2^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [2^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	2—1 2—2 2—3 2—2 2—1
2809,514 2808,685 2678,086 2671,829 2660,996	5 1 5 6 7	32,84 36,85 36,35 36,35 36,35	37,26 41,27 40,98 40,99 41,01	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3p \ [2^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \end{array}$	2-1 3-3 1-0 1-1 1-2
2611,815 2594,965 2586,312 2531,548 2515,460	7 1 2 6 2	36,35 36,35 36,35 36,35 36,35	41 ,10 41 ,13 41 ,15 41 ,25 41 ,28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 2 \\ 1 - 1 \\ 1 - 1 \\ 1 - 0 \\ 1 - 2 \end{array} $
2506,295 2493,153 2394,051 2387,026 2315,65	2 5 2 2 0	36,35 33,32 — — 32,94	41,30 38,29 — 38,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-0 - 1-0
376 ,375 372 ,069 302 ,28 301 ,432 301 ,311	3 6 0 1 0	0,00 0,00 0,00 0,00 0,00	32,94 33,32 40,99 41,13 41,15	$\begin{array}{c} 2p^{6} {}^{1}S - 3s [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3s' [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3d [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3d [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 4s [1^{1}/_{2}]^{\circ} \end{array}$	0-1 0-1 0-1 0-1 0-1
300,151 282,96 282,827 281,81 275,10	1 1 0 1 0	0,00 0,00 0,00 0,00 0,00	41,31 43,80 43,83 43,98 45,07	$\begin{array}{c} 2p^{6} {}^{1}S - 3d' \left[1^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5s \left[1^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d \left[1^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5s' \left[1/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 6s \left[1^{1}/_{2} \right]^{\circ} \end{array}$	0—1 0—1 0—1 0—1 0—1
273,99 271,01 269,98	0 0 0	0,00 0,00 0,00	45,25 45,75 45,91	$2p^{6} {}^{1}S - 6s' {}^{[1/_{2}]^{\circ}} \ 2p^{6} {}^{1}S - 7s {}^{[1/_{2}]^{\circ}} \ 2p^{6} {}^{1}S - 7s' {}^{[1/_{2}]^{\circ}} \$	0—1 0—1 0—1

Na III, ground state $1s^2 \ 2s^2 \ 2p^5 \ ^2P^0_{3/2}$ Ionization potential $578\ 033\ {
m cm}^{-1};\ 71,662\ {
m eV}$

TOHIZATION	poten	tiai orc	ooo cm	, 11,002,00	
λ, Å	I	$E_{ m H},\;\;{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
2563,32 2553,61 2542,89 2530,21 2510,37	25 25 10 15 20	45,57 45,51 45,57 45,51 45,51	50,40 50,36 50,44 50,40 50,44	$3s ^4P - 3p ^4P^{\circ}$ $3s ^4P - 3p ^4P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
2497,05 2474,69 2468,86 2459,40 2421,00	50 40 30 45 8	45,40 45,40 46,45 46,32 49,49	50,36 50,40 51,47 51,36 54,61	$3s ^4P - 3p ^4P^{\circ} \ 3s ^4P - 3p ^4P^{\circ} \ 3s ^2P - 3p ^2D^{\circ} \ 3s ^2P - 3p ^2D^{\circ} \ 3s' ^2D - 3p' ^2F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
2406,58 2367,33 2314,66 2309,96 2297,14	18 4 3 30 25	46,32 46,45 51,75 46,32	51 ,47 51 ,69 57 ,10 51 ,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ \end{array} $
2296,64 2285,72 2279,85 2278,48 2267,96	25 35 3 40 8	49,49 46,45 51,69 46,45 49,49	54,87 51,87 57,12 51,89 54,95	$3s' ^{2}D - 3p' ^{2}P^{\circ}$ $3s ^{2}P - 3p ^{2}P^{\circ}$ $3p ^{2}S^{\circ} - 3d ^{4}D$ $3s ^{2}P - 3p ^{2}P^{\circ}$ $3s' ^{2}D - 3p' ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
2251,44 2251,17 2246,66 2244,17 2239,43	45 20 40 3 45	45,57 51,89 45,51 51,87 45,57	51,07 57,40 51,02 57,40 51,10	$3s ^4P - 3p ^4D^{\circ} \ 3p ^2P^{\circ} - 3d ^4P \ 3s ^4P - 3p ^4D^{\circ} \ 3p ^2P^{\circ} - 3d ^4P \ 3s ^4P - 3p ^4D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
2232,17 2230,30 2229,56 2226,19 2225,90	40 50 15 8 45	46,32 45,39 51,87 51,89 45,51	51,87 50,95 57,43 57,46 51,07	$3s^{2}P - 3p^{2}P^{\circ}$ $3s^{4}P - 3p^{4}D^{\circ}$ $3p^{2}P^{\circ} - 3d^{4}P$ $3p^{2}P^{\circ} - 3d^{4}F$ $3s^{4}P - 3p^{4}D^{\circ}$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$
2225,29 2222,79 2214,17 2211,16 2202,78	$egin{array}{c} 12 \\ 0 \\ 25 \\ 1 \\ 40 \end{array}$	46,32 51,75 45,51 51,87 45,39	51,89 57,33 51,10 57,48 51,02	$3s^{2}P - 3p^{2}P^{\circ} \ 3p^{4}S^{\circ} - 3d^{4}P \ 3s^{4}P - 3p^{4}D^{\circ} \ 3p^{2}P^{\circ} - 3d^{4}F \ 3s^{4}P - 3p^{4}D^{\circ}$	3/2 - 1/2 $3/2 - 1/2$ $3/2 - 1/2$ $3/2 - 1/2$ $3/2 - 5/2$ $5/2 - 5/2$
2200,37 2198,01 2194,85 2193,08 2190,18	2 2 1 1 5	51 ,47 51 ,69 51 ,75 51 ,47 49 ,49	57,10 57,33 57,40 57,12 55,15	$3p ^2D^{\circ} - 3d ^4D$ $3p ^2S^{\circ} - 3d ^4P$ $3p ^4S^{\circ} - 3d ^4P$ $3p ^2D^{\circ} - 3d ^4D$ $3s' ^2D - 3p' ^2D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
2182,74 2180,63 2174,43 2173,84 2170,63	15 0 3 1 0	45,39 51,75 51,87 51,36 51,69	51,07 57,43 57,57 57,06 57,40	$3s ^4P - 3p ^4D^{\circ}$ $3p ^4S^{\circ} - 3d ^4P$ $3p ^2P^{\circ} - 3d ^2D$ $3p ^2D^{\circ} - 3d ^4D$ $3p ^2S^{\circ} - 3d ^4P$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \end{array} $
2166,67 2163,32 2147,37 2117,08 2116,70	3 1 1 0 8	51,36 51,75 51,69 51,47 45,51	57,08 57,48 57,46 57,33 51,36	$3p \ ^{2}D^{\circ} - 3d \ ^{4}D$ $3p \ ^{4}S^{\circ} - 3d \ ^{4}F$ $3p \ ^{2}S^{\circ} - 3d \ ^{4}F$ $3p \ ^{2}D^{\circ} - 3d \ ^{4}P$ $3s \ ^{4}P - 3p \ ^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
2107,62 2099,60 2079,06 2073,38 2067,41	1 1 0 10 18	51,89 45,57 51,75 51,47 51,89 51,87	57 ,77 51 ,47 57 ,65 57 ,43 57 ,87 57 ,87	$3p ^2P^{\circ} - 3d ^2P$ $3s ^4P - 3p ^2D^{\circ}$ $3p ^4S^{\circ} - 3d ^2D$ $3p ^2D^{\circ} - 3d ^4P$ $3p ^2P^{\circ} - 3d ^2P$ $3p ^2P^{\circ} - 3d ^2P$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
•					925

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2065,23 2062,97 2058,72 2055,17 2051,90	10 8 8 10 8	51,10 51,07 51,10 51,07 51,02	57,10 57,08 57,12 57,10 57,06	3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 4D 3p 4D°-3d 4D	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
2048,67 2045,41 2041,09 2037,70 2035,84	8 18 0 10 3	51,07 51,02 51,36 51,02 55,14	57,12 57,08 57,43 57,10 61,23	$3p ^4D^{\circ} - 3d ^4D$ $3p ^4D^{\circ} - 3d ^4D$ $3p ^2D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4D$ $3p' ^2D^{\circ} - 3d' ^2D$	3/2 - 1/2 $5/2 - 5/2$ $5/2 - 5/2$ $5/2 - 3/2$ $5/2 - 3/2$
2032,65 2031,10 2028,55 2025,44 2022,27	0 10 25 8 10	51,36 51,47 50,95 51,75 51,87 50,95	57,46 57,57 57,06 57,87 57,99 57,08	$3p ^{2}D^{\circ} - 3d ^{4}F$ $3p ^{2}D^{\circ} - 3d ^{2}D$ $3p ^{4}D^{\circ} - 3d ^{4}D$ $3p ^{4}S^{\circ} - 3d ^{2}P$ $3p ^{2}P^{\circ} - 4s ^{4}P$ $3p ^{4}D^{\circ} - 3d ^{4}D$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \end{array} $
2011,88 2008,43 2005,33 2005,24 2004,80	30 8 6 30	51,36 55,15 55,14 45,57 51,47 51,69	57,52 61,32 61,32 51,75 57,65 57,87	$3p ^2D^{\circ} - 3d ^2F$ $3p' ^2D^{\circ} - 3d' ^2D$ $3p' ^2D^{\circ} - 3d' ^2D$ $3s ^4P - 3p ^4S^{\circ}$ $3p ^2D^{\circ} - 3d ^2D$ $3p ^2S^{\circ} - 3d ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1995,62 1985,58 1980,95 1977,14 1976,62	3 30 0 1 1	51,36 51,87 45,51 54,89 54,89 54,95	57,57 58,08 51,75 61,14 61,16 61,23	$3p^{2}D^{\circ}-3d^{2}D$ $3p^{2}P^{\circ}-4s^{4}P$ $3s^{4}P-3p^{4}S^{\circ}$ $3p'^{2}P^{\circ}-3d'^{2}P$ $3p'^{2}P^{\circ}-3d'^{2}P$ $3p'^{2}P^{\circ}-3d'^{2}D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
1975,58 1965,04 1960,76 1956,48 1955,31	0 18 20 0 8	55, 15 50, 95 51, 07 51, 75 54, 89	61,42 57,26 57,40 58,08 61,23	$3p' \ ^{2}D^{\circ} - 3d' \ ^{2}F$ $3p \ ^{4}D^{\circ} - 3d \ ^{4}F$ $3p \ ^{4}D^{\circ} - 3d \ ^{4}P$ $3p \ ^{4}S^{\circ} - 4s \ ^{4}P$ $3p' \ ^{2}P^{\circ} - 3d' \ ^{2}D$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
1951,21 1950,79 1946,70 1946,43 1944,99	$egin{array}{c} 40 \\ 15 \\ 0 \\ 20 \\ 3 \end{array}$	45,40 51,10 45,51 54,62 51,02	51,75 57,46 51,87 60,98 57,40	$3s ^4P - 3p ^4S^{\circ}$ $3p ^4D^{\circ} - 3d ^4F$ $3s ^4P - 3p ^2P^{\circ}$ $3p' ^2F^{\circ} - 3d' ^2G$ $3p ^4D^{\circ} - 3d ^4P$	$\begin{array}{c} 5/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 7/_2 - 7/_2 \\ 5/_2 - 3/_2 \end{array}$
1943,40 1942,19 1941,77 1941,61 1939,32	6 6 0 0	54,61 51,36 51,07 45,51 51,02	60,98 57,74 57,46 51,89 57,42	$3p' {}^{2}F^{\circ} - 3d' {}^{2}G$ $3p {}^{2}D^{\circ} - 3d {}^{2}F$ $3p {}^{4}D^{\circ} - 3d {}^{4}F$ $3s {}^{4}P - 3p {}^{2}P^{\circ}$ $3p {}^{4}D^{\circ} - 3d {}^{4}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
1935,54 1933,87 1927,21 1926,27 1920,12	0 30 15 45 6	51,07 51,02 54,89 51,02 51,02	57,48 57,43 61,32 57,46 57,48	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
1918,46 1913,47 1899,70 1890,75 1887,48	6 8 3 12 15	50,95 50,95 50,95 51,89 50,95	57,42 57,43 57,48 58,45 57,52	$3p ^4D^{\circ} - 3d ^4F$ $3p ^4D^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 3d ^4F$ $3p ^2P^{\circ} - 4s ^2P$ $3p ^4D^{\circ} - 3d ^2F$	7/2 - 7/2 $7/2 - 5/2$ $7/2 - 5/2$ $7/2 - 5/2$ $1/2 - 3/2$ $7/2 - 7/2$
1885,75 1874,22 1873,32 1872,45 1869,43	4 0 4 1 1	51,87 51,47 54,61 50,95 51,36	58,45 58,08 61,23 57,57 57,99	$3p^{2}P^{\circ}-4s^{2}P$ $3p^{2}D^{\circ}-4s^{4}P$ $3p'^{2}F^{\circ}-3d'^{2}D$ $3p^{4}D^{\circ}-3d^{2}D$ $3p^{2}D^{\circ}-4s^{4}P$	3/2 - 3/2 $3/2 - 3/2$ $5/2 - 3/2$ $7/2 - 5/2$ $5/2 - 5/2$

λ, Å	I	$E_{ m H},\;{ m eV}$	$E_{\mathbf{B}},\;eV$	Transition	J
1862,40 1861,19 1859,61 1859,20 1857,57	6 15 0 0 5	51,89 50,44 51,47 51,10 51,87	58,55 57,10 58,14 57,77 58,55	$3p \ ^{2}P^{\circ}-4s \ ^{2}P$ $3p \ ^{4}P^{\circ}-3d \ ^{4}D$ $3p \ ^{2}D^{\circ}-4s \ ^{4}P$ $3p \ ^{4}D^{\circ}-3d \ ^{2}P$ $3p \ ^{2}P^{\circ}-4s \ ^{2}P$	1/2 - 1/2 $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 1/2$ $3/2 - 1/2$
1856,73 1855,91 1850,39 1850,24 1849,58	20 15 18 20 35	50,40 50,44 50,40 54,62 50,36	57,08 57,12 57,10 61,32 57,06	$3p ^4P^{\circ} - 3d ^4D$ $3p ^4P^{\circ} - 3d ^4D$ $3p ^4P^{\circ} - 3d ^4D$ $3p' ^2F^{\circ} - 3d' ^2D$ $3p ^4P^{\circ} - 3d ^4D$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1847,54 1845,10 1844,36 1843,43 1838,11	10 12 20 2 6	54,61 50,40 50,36 51,02 51,36 50,36	61,32 57,12 57,08 57,74 58,09 57,10	$3p' \ ^2F^{\circ} - 3d' \ ^2D$ $3p \ ^4P^{\circ} - 3d \ ^4D$ $3p \ ^4P^{\circ} - 3d \ ^4D$ $3p \ ^4D^{\circ} - 3d \ ^2F$ $3p \ ^2D^{\circ} - 4s \ ^4P$ $3p \ ^4P^{\circ} - 3d \ ^4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
1835,22 1825,44 1824,52 1821,68 1819,01	15 10 0 12 2	54,95 50,95 51,07 54,62 54,61	61 ,71 57 ,74 57 ,87 61 ,42 61 ,42	$3p' ^{2}P^{\circ} - 3d' ^{2}S$ $3p ^{4}D^{\circ} - 3d ^{2}F$ $3p ^{4}D^{\circ} - 3d ^{2}P$ $3p' ^{2}F^{\circ} - 3d' ^{2}F$ $3p' ^{2}F^{\circ} - 3d' ^{2}F$	$ \begin{array}{c} 1/_2 - 1/_2 \\ 7/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 7/_2 - 7/_2 \\ 5/_2 - 7/_2 \end{array} $
1816,83 1814,35 1811,70 1810,74 1801,27	2 3 5 4 7	54,89 54,62 54,61 51,02 50,44	61,71 61,45 61,45 57,87 57,33	$3p' \ ^{2}P^{\circ} - 3d' \ ^{2}S$ $3p' \ ^{2}F^{\circ} - 3d' \ ^{2}F$ $3p' \ ^{2}F^{\circ} - 3d' \ ^{2}F$ $3p \ ^{4}D^{\circ} - 3d \ ^{2}P$ $3p \ ^{4}P^{\circ} - 3d \ ^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
1791,80 1791,23 1782,92 1775,32 1773,00	8 10 12 0 0	51,07 50,40 50,44 51,10 50,40	57,99 57,33 57,40 58,08 57,40	$3p ^4D^{\circ} - 4s ^4P$ $3p ^4P^{\circ} - 3d ^4P$ $3p ^4P^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 4s ^4P$ $3p ^4P^{\circ} - 3d ^4P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
1767,21 1763,84 1762,13 1761,05 1754,97	0 3 0 1 0	50,44 50,40 51,10 50,95 51,02	57,46 57,43 58,14 57,99 58,08	$3p ^4P^{\circ} - 3d ^4F$ $3p ^4P^{\circ} - 3d ^4P$ $3p ^4D^{\circ} - 4s ^4P$ $3p ^4D^{\circ} - 4s ^4P$ $3p ^4D^{\circ} - 4s ^4P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
1752,65 1752,06 1746,39 1741,33 1731,08	3 1 0 1 0	50,36 51,47 50,36 50,36 50,36	57,43 58,55 57,46 57,48 57,52	$3p ^4P^{\circ} - 3d ^4P$ $3p ^2D^{\circ} - 4s ^2P$ $3p ^4P^{\circ} - 3d ^4F$ $3p ^4P^{\circ} - 3d ^2F$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1719,60 1718,48 1691,70 1678,74 1669,52	0 0 1 1 3	50,44 50,36 50,44 50,36 51,02 50,44	57,65 57,57 57,77 57,74 58,45 57,87	$3p ^4P^{\circ} - 3d ^2D$ $3p ^4P^{\circ} - 3d ^2D$ $3p ^4P^{\circ} - 3d ^2P$ $3p ^4P^{\circ} - 3d ^2F$ $3p ^4D^{\circ} - 4s ^2P$ $3p ^4P^{\circ} - 3d ^2P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 1/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
1658,71 1650,91 1633,64 1624,07 1621,94	2 1 4 12 5	51,07 50,36 50,40 50,36 50,44	58,55 57,87 57,99 57,99 58,08	$3p ^4D^{\circ} - 4s ^2P$ $3p ^4P^{\circ} - 3d ^2P$ $3p ^4P^{\circ} - 4s ^4P$ $3p ^4P^{\circ} - 4s ^4P$ $3p ^4P^{\circ} - 4s ^4P$	3/2 - 1/2 $5/2 - 3/2$ $3/2 - 5/2$ $5/2 - 5/2$ $1/2 - 3/2$
1613,77 1610,97 1604,47 1602,91 1548,68 1541,19	8 4 6 5 8	50,40 50,44 50,36 50,40 50,44	58,08 58,14 58,08 58,14 58,45	3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 4P 3p 4P°-4s 2P 3p 4P°-4s 2P 3p 4P°-4s 2P 3p 4P°-4s 2P	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
1529,67	1	50,44	58,55	op F —48 -F	72 72

λ, Å	I	E _H , eV	$E_{ m B},~{ m eV}$	Transition	J
		H	В.		
1458 ,15 1436 ,21 1427 ,27	$\begin{array}{c} 3 \\ 12 \\ 0 \end{array}$	46,45 46,32 46,45	54,95 54,95 55,14	3s ² P-3p' ² P° 3s ² P-3p' ² P° 3s ² P-3p' ² D°	$^{1/_{2}-1/_{2}}_{^{3/_{2}-1/_{2}}}$ $^{1/_{2}-3/_{2}}_{^{2}}$
1337,39 1265,66 1256,68 1235,40 1224,73	6 2 1 4 4	51,87 51,36 51,36 50,95 51,10	61,14 61,16 61,23 60,98 61,23	$3p \ ^{2}P^{\circ}-3d' \ ^{2}P$ $3p \ ^{2}D^{\circ}-3d' \ ^{2}P$ $3p \ ^{2}D^{\circ}-3d' \ ^{2}D$ $3p \ ^{4}D^{\circ}-3d' \ ^{2}G$ $3p \ ^{4}D^{\circ}-3d' \ ^{2}D$	3/2 - 1/2 $5/2 - 3/2$ $5/2 - 3/2$ $7/2 - 7/2$ $1/2 - 3/2$
1223,44 1221,12 1180,40 1153,04 1122,30	4 5 8 2 0	51,02 51,07 55,12 50,40 50,40	61,16 61,23 65,64 61,16 61,45	$3p \ ^4D^{\circ} - 3d' \ ^2P$ $3p \ ^4D^{\circ} - 3d' \ ^2D$ $3p' \ ^2D^{\circ} - 3d'' \ ^2D$ $3p \ ^4P^{\circ} - 3d' \ ^2P$ $3p \ ^4P^{\circ} - 3d' \ ^2F$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
1100,49 380,107 378,143 272,441 268,623	5 8 10 0 5	50,44 0,17 0,00 0,00 0,00	61,71 32,78 32,78 45,51 46,32	$3p ^4P^{\circ} - 3d' ^2S$ $2p^5 ^2P^{\circ} - 2p^6 ^2S$ $2p^5 ^2P^{\circ} - 2p^6 ^2S$ $2p^5 ^2P^{\circ} - 3s ^4P$ $2p^5 ^2P^{\circ} - 3s ^2P$	1/2 - 1/2 $1/2 - 1/2$ $3/2 - 1/2$ $3/2 - 3/2$ $1/2 - 3/2$
267,868 267,642 266,893 251,371 250,515	6 8 5 6 8	0,17 0,00 0,00 0,17 0,00	46,45 46,32 46,45 49,49 49,49	$2p^{5} \ ^{2}P^{\circ} - 3s \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3s \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3s \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3s' \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3s' \ ^{2}D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2}, 5/_{2} \end{array} $
230,593 229,868 216,120 215,671 215,340	2 3 1 4 4	0,17 0,00 0,17 0,00	53,93 53,93 — 57,65 57,57	$2p^{5} \ ^{2}P^{\circ} - 3s'' \ ^{2}S$ $2p^{5} \ ^{2}P^{\circ} - 3s'' \ ^{2}S$ $ 2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \\ - \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
215,230 215,042 214,868 214,596 214,235	4 2 4 2 4	0,17 0,00 0,17 0,00 0,00	57,77 57,67 57,87 57,77 57,87	$2p^5 \ ^2P^{\circ} - 3d \ ^2P$ $2p^5 \ ^2P^{\circ} - 3d \ ^2D$ $2p^5 \ ^2P^{\circ} - 3d \ ^2P$ $2p^5 \ ^2P^{\circ} - 3d \ ^2P$ $2p^5 \ ^2P^{\circ} - 3d \ ^2P$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
203,324 203,282 203,050 202,760 202,720	2 2 3 3 3	0,17 0,17 0,17 0,00 0,00	61,14 61,16 61,23 61,14 61,16	$2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
202,490 202,184 195,538 194,306 194,166	2 4 0 1 0	00,00 00,00 0,00 0,00 0,00	61,23 61,32 63,40 63,81 63,85	$2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{2}P$	3/2 - 3/2 $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 1/2$
194,032 189,346 188,870 184,218 183,747 183,575	1 1 2 0 0 0	0,00 0,17 0,00 0,17 0,00 0,00	63,90 65,65 65,64 67,47 67,47	$2p^{5} {}^{2}P^{\circ} - 4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$	$\begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2, & 5/2 \\ 1/2 - 1/2, & 3/2 \\ 3/2 - 1/2, & 3/2 \\ 3/2 - 3/2, & 5/2 \end{array}$

Na IV, ground state $1s^2 \ 2s^2 \ 2p^4 \ ^3P_2$ Ionization potential 797 741 cm⁻¹; 98,902 eV

λ, Λ	r	$E_{_{ m II}},{ m eV}$	$E_{_{ m B}},{ m eV}$	Transition	J
412,240 411,333	8 7	0,14 0,20	30,21 30,34	$2p^4 \ ^3P - 2p^5 \ ^3P^{\circ} \ 2p^4 \ ^3P - 2p^5 \ ^3P^{\circ}$	1-2 0-1

λ, λ	I	E _H , eV	E _B , eV	Transition	J
410,540	6	0,14	30,34	$2p^4 \ ^3P - 2p^5 \ ^3P^\circ \ 2p^4 \ ^3P - 2p^5 \ ^3P^\circ \ 2p^4 \ ^3P - 2p^5 \ ^3P^\circ$	1-1
410,371	10	0,00	30,21		2-2
409,615	8	0,14	30,40		1-0
408,682	8	0,00	30,34	$2p^4 {}^3P - 2p^5 {}^3P^\circ \ 2p^4 {}^1S - 2p^5 {}^1P^\circ \ 2p^4 {}^1D - 2p^5 {}^1P^\circ \ 2p^4 {}^3P - 3s {}^3S^\circ \ 2p^4 {}^3P - 3s {}^3S^\circ \ $	2—1
360,761	6	8,28	42,64		0—1
319,638	10	3,86	42,64		2—1
206,155	3	0,20	60,33		0—1
205,956	4	0,14	60,33		1—1
205,487 203,959 199,769 191,000 190,835	6 2 6 6 8	0,00 8,28 3,86 0,20 0,14	60,33 69,07 65,92 65,10 65,10	$2p^4 \ ^3P - 3s \ ^3S^{\circ} \ 2p^4 \ ^1S - 3s'' \ ^1P^{\circ} \ 2p^4 \ ^1D - 3s' \ ^1D^{\circ} \ 2p^4 \ ^3P - 3s' \ ^3D^{\circ} \ 2p^4 \ ^3P - 3s' \ ^3D^{\circ}$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 2-2 \\ 0-1 \\ 1-2 \end{array} $
190,440	10	0,00	65,10	$2p^4 \ ^3P - 3s' \ ^3D^\circ \ 2p^4 \ ^1D - 3s'' \ ^1P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ$	2-3
190,126	6	3,86	69,07		2-1
182,282	4	0,20	68,21		0-1
182,128	6	0,14	68,21		1-0, 1, 2
181,758	8	0,00	68,21		2-1, 2
174,008 168,544 168,409 168,084 164,841	0 5 8 10 4	8,28 0,20 0,14 0,00	79,53 73,75 73,75 73,76	$\begin{array}{c} 2p^4 \ ^1S - 3d' \ ^1P^\circ \\ 2p^4 \ ^3P - 3d \ ^3D^\circ \\ 2p^4 \ ^3P - 3d \ ^3D^\circ \\ 2p^4 \ ^3P - 3d \ ^3D^\circ \\ - \end{array}$	0-1 $0-1$ $1-1$, 2 $2-3$
163,840	4	3,86	79,53	$2p^{4} ^{1}D - 3d' ^{1}P^{\circ}$	$ \begin{array}{r} 2-4 \\ 2-2 \\ 2-3 \\ 2-2 \\ 2-1 \end{array} $
163,187	6	3,86	79,83	$2p^{4} ^{1}D - 3d' ^{1}D^{\circ}$	
162,445	8	3,86	80,18	$2p^{4} ^{1}D - 3d' ^{1}F^{\circ}$	
157,782	3	3,86	82,43	$2p^{4} ^{1}D - 3d'' ^{1}D^{\circ}$	
157,599	1	3,86	82,52	$2p^{4} ^{1}D - 3d'' ^{1}P^{\circ}$	
157,090	4	3,86	82,78	$2p^{4} ^{1}D - 3d'' ^{1}F^{\circ}$	$ \begin{array}{c} 2-3 \\ 0-1 \\ 1-2 \\ 2-3 \\ 0-1 \end{array} $
156,887	3	0,20	79,21	$2p^{4} ^{3}P - 3d' ^{3}D^{\circ}$	
156,780	5	0,14	79,21	$2p^{4} ^{3}P - 3d' ^{3}D^{\circ}$	
156,536	8	0,00	79,21	$2p^{4} ^{3}P - 3d' ^{3}D^{\circ}$	
155,832	0	0,20	79,76	$2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$	
155,781 155,693 155,622 155,515	1 2 0 4	$ \begin{array}{c} 0,14 \\ 0,14 \\ 0,20 \\ 0,00 \\ 0,14 \end{array} $	79,72 79,77 79,86 79,72 79,86	$2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}S^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}S^{\circ}$	1-2 $1-0$, 1 $0-1$ $2-2$ $1-1$
155,445 155,354 155,248 155,090 151,303 151,048	3 0 2 1 1 0	0,00 0,14 0,00 0,00 3,86 0,20	79,76 79,94 79,86 79,94 85,80 82,27	$2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 4s ^{3}S^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}S^{\circ}$ $2p^{4} ^{3}P - 4s ^{3}S^{\circ}$ $2p^{4} ^{3}P - 4s' ^{1}D^{\circ}$ $2p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 2-1 \\ 2-1 \\ 2-2 \\ 0-1 \end{array} $
150,968	2	0,14	82,27	$2p^4 \ ^3P - 3d'' \ ^3P^\circ$ $2p^4 \ ^3P - 3d'' \ ^3P^\circ$ $2p^4 \ ^3P - 3d'' \ ^3D^\circ$ $2p^4 \ ^3P - 3d'' \ ^3D^\circ$ $2p^4 \ ^3P - 3d'' \ ^3D^\circ$	1-0, 1, 2
150,695	2	0,00	82,27		2-1, 2
150,647	2	0,20	82,49		0-1
150,545	3	0,14	82,49		1-1, 2
150,297	4	0,00	82,49		2-1, 2, 3
146,397 146,297 146,060 145,846 144,979	$\begin{array}{c} 1\\3\\0\\0\end{array}$	0,20 0,14 0,00 3,86 0,00	84,88 84,88 84,88 88,86 85,51	$2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d \ ^3D^{\circ}$ $2p^4 \ ^1D - 4s'' \ ^1P^{\circ}$ $2p^4 \ ^3P - 4s' \ ^3D^{\circ}$	0-1 1-1, 2 2-1, 2, 3 2-2 2-1, 2, 3
142,688	$\begin{array}{ccc} 1 & 1 \\ 2 & 0 \end{array}$	3,86	90,74	$2p^{4} \stackrel{1}{1}D - 4d' \stackrel{1}{1}P^{\circ}$	2-1
142,363		3,86	90,94	$2p^{4} \stackrel{1}{1}D - 4d' \stackrel{1}{1}D^{\circ}$	2-2
142,232		3,86	91,02	$2p^{4} \stackrel{1}{1}D - 4d' \stackrel{1}{1}F^{\circ}$	2-3
139,869		0,00	88,64	$2p^{4} \stackrel{3}{1}P - 4s'' \stackrel{3}{1}P^{\circ}$	2-1, 2
137,945		3,86	93,73	$2p^{4} \stackrel{1}{1}D - 4d'' \stackrel{1}{1}D^{\circ}$	2-2

λ, Å	I	E _H , eV	E _B , eV	Transition	J
137,714 137,144 137,062 136,854 136,748	0 0 0 1	3,86 0,20 0,14 0,00 0,14	93,88 90,60 90,60 90,60 90,80	$2p^4 ^1D - ^4d'' ^1F^\circ$ $2p^4 ^3P - ^4d' ^3D^\circ$ $2p^4 ^3P - ^4d' ^3D^\circ$ $2p^4 ^3P - ^4d' ^3D^\circ$ $2p^4 ^3P - ^4d' ^3P^\circ$	2—3 0—1 1—1, 2 2—1, 2, 3 1—0, 1, 2
136,645 136,550 136,435 132,740 132,465 132,211 129,464	0 1 0 0 0	0,14 0,00 0,00 0,00 0,14 0,00 0,00	90,87 90,80 90,87 93,40 93,77 93,77 95,76	$2p^4 \ ^3P - 4d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 4d' \ ^3P^{\circ}$ $2p^4 \ ^3P - 4d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 5s' \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d'' \ ^3D^{\circ}$ $2p^4 \ ^3P - 4d'' \ ^3D^{\circ}$ $2p^4 \ ^3P - 5d' \ ^3D^{\circ}$	1-1 2-1, 2 2-1 2-1, 2, 3 1-1, 2 2-1, 2, 3 2-1, 2, 3

Na V, ground state $1s^2 \ 2s^2 \ 2p^3 \ ^4S_{3/2}^0$ Ionization potential 1116312 cm⁻¹; 138,840 eV

λ, Å	I	E_{H} , eV	$E_{\mathbf{B}}$, eV	Transition	J
514,350 511,193 510,102 463,263 461,051	0 1 0 12 10	46,26 46,12 46,26 0,00 0,00	70,37 70,37 70,57 26,76 26,89	$2p^4 \ ^2P - 2p^5 \ ^2P^\circ \ 2p^4 \ ^2P - 2p^5 \ ^2P^\circ \ 2p^4 \ ^2P - 2p^5 \ ^2P^\circ \ 2p^3 \ ^4S^\circ - 2p^4 \ ^4P \ 2p^3 \ ^4S^\circ - 2p^4 \ ^4P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
459,897 445,190 445,046 400,722 369,743	7 7 6 10 3	0,00 8,99 8,98 5,90 36,84	26,96 36,84 36,84 36,84 70,37	$2p^3 {}^4S^{\circ} - 2p^4 {}^4P$ $2p^3 {}^2P^{\circ} - 2p^4 {}^2D$ $2p^3 {}^2P^{\circ} - 2p^4 {}^2D$ $2p^3 {}^2D^{\circ} - 2p^4 {}^2D$ $2p^4 {}^2D - 2p^5 {}^2P^{\circ}$	$\begin{array}{c} 3/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2, \begin{array}{c} 5/_2 - 3/_2, \\ 5/_2 - 3/_2 \end{array}$
367,557 360,367 360,319 333,910 332,550	2 8 8 9 8	36,84 8,99 8,98 8,99 8,98	70,57 43,39 43,39 46,12 46,26	$2p^4 \ ^2D - 2p^5 \ ^2P^\circ \ 2p^3 \ ^2P^\circ - 2p^4 \ ^2S \ 2p^3 \ ^2P^\circ - 2p^4 \ ^2S \ 2p^3 \ ^2P^\circ - 2p^4 \ ^2P \ 2p^3 \ ^2P^\circ - 2p^4 \ ^2P$	3/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 3/2$ $1/2 - 1/2$
330,718 308,264 307,152 171,076 170,923	0 10 8 1 1	5,90 5,90 5,90 26,96 26,89	43,39 46,12 46,26 99,42 99,42	$2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}S$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}P$ $2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$ $2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$	3/2 - 1/2 $5/2 - 3/2$ $3/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$
170,631 167,510 163,930 163,616 157,511	1 1 2 3 2	26,76 36,84 8,98 8,98 5,90	99,42 110,84 84,61 84,76 84,61	$2p^4 \ ^4P - 3s''' \ ^4S^\circ$ $2p^4 \ ^2D - 3s^{\mathrm{IV}} \ ^2D^\circ$ $2p^3 \ ^2P^\circ - 3s \ ^2P$ $2p^3 \ ^2P^\circ - 3s \ ^2P$ $2p^3 \ ^2D^\circ - 3s \ ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
157,209 157,036 151,303 151,188 151,127	3 2 1 1 4	5,90 8,98 26,96 26,89 5,90	84,76 87,93 108,89 108,89 87,93	$2p^{3} {}^{2}D^{\circ} - 3s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3s' {}^{2}D$ $2p^{4} {}^{4}P - 3s^{\text{IV}} {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 3s^{\text{IV}} {}^{4}D^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 3s' {}^{2}D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
150,968 149,001 148,856 148,642 147,897	2 2 3 4 2	26,76 0,00 0,00 0,00 0,00 8,98	108,89 83,21 83,29 83,41 92,81	$2p^{4} \stackrel{4}{}^{9} - 3s^{1} \stackrel{4}{}^{9} O^{\circ}$ $2p^{3} \stackrel{4}{}^{9} S^{\circ} - 3s^{4} P$ $2p^{3} \stackrel{4}{}^{8} S^{\circ} - 3s^{4} P$ $2p^{3} \stackrel{4}{}^{9} S^{\circ} - 3s^{4} P$ $2p^{3} \stackrel{2}{}^{9} P^{\circ} - 3s^{''} \stackrel{2}{}^{2} S$	$3/_{2}$, $5/_{2}$ — $3/_{2}$, $5/_{2}$ $5/_{2}$ — $3/_{2}$, $5/_{2}$, $5/_{2}$ $3/_{2}$ — $1/_{2}$ $3/_{2}$ — $3/_{2}$ $3/_{2}$ — $3/_{2}$ $3/_{2}$ — $3/_{2}$ $1/_{2}$ $3/_{2}$ — $1/_{2}$

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λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
144,661	1	26,96	112,66	$2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$	1/ ₂ —1/ ₂ , 3/ ₂
144,54 6	2	26,89	112,66	$2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$	$^{3}/_{2}$ — $^{1}/_{2}$, $^{3}/_{2}$, $^{5}/_{2}$
144,330	2	26,76	112,66	$2p^{4} ^{4}P - 3d^{"'} ^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$, $\frac{5}{2}$, $\frac{7}{2}$
142,415	0	26,89	113,94	$2p^{4} {}^{4}P - 3s^{V} {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$, $\frac{3}{2}$, $\frac{5}{2}$
142,232	2	26,76	113,94	$2p^{4} ^{4}P - 3s^{V} ^{4}P^{\circ}$	$^{5}/_{2}$ — $^{3}/_{2}$, $^{5}/_{2}$
140 ,25 8	0	36,84	125,23	$2p^4 {}^2D - 3d^{IV} {}^2F^c$	⁵ / ₂ — ⁷ / ₂
140,171	0	36,84	125,23	$2p^{4} {}^{2}D - 3d^{IV} {}^{2}F^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
138,917	3	8,98	98,23	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$	$\frac{1}{2}$, $\frac{3}{2}$ — $\frac{3}{2}$
812, 818 135, 854	$\frac{2}{3}$	8,98 8,98	$98,29 \\ 100,24$	$2p^{3} {}^{2}P -3d {}^{2}P 2p^{3} {}^{2}P -3d {}^{2}D$	$^{1}/_{2}, \ ^{3}/_{2}$ $^{-1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$
135,791	3	8,99	100,28	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$	³ / ₂ — ⁵ / ₂
134,272	2	5 ,90	98,23	$2p^{3} 2D^{\circ} - 3d^{2}P$	$^{5}/_{2}$ — $^{3}/_{2}$
134,183	0	5,90 5,00	98,29 98,84	$2p^{3} 2D^{\circ} - 3d^{2}P$ $2p^{3} 2D^{\circ} - 3d^{2}F$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
388, 388 133, 162	$\frac{4}{5}$	$\substack{5,90\\5,90}$	99,00	$2p^{3-1}D - 3d^{-1}F$ $2p^{3-2}D^{\circ} - 3d^{-2}F$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
131,635	3	8,98	103,16	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	$\frac{1}{2}$, $\frac{3}{2}$ $\frac{3}{2}$
131,413	2	5,90	100,24	$2p^{3} 2D^{\circ} - 3d^{2}D$	$^{3}/_{2}$ — $^{3}/_{2}$
131,345	3	5,90	100,28	$\frac{2p^{3}}{2p^{3}}\frac{^{2}D^{\circ}}{^{2}P^{\circ}}-3d^{2}D$ $\frac{2p^{3}}{^{2}P^{\circ}}-3d^{\prime}\frac{^{2}P}{^{2}P^{\circ}}$	$\frac{5}{2} - \frac{5}{2}$
130 ,723 130 ,680	$rac{1}{2}$	8,98 8,98	103,82 103,86	$2p^{\circ} \cdot P - 3a \cdot P$ $2p^{\circ} \cdot 2P \circ - 3d' \cdot 2P$	$\frac{1}{2}$, $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$, $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
129,942	1	8,98	104,40	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}S$	$\frac{1}{2}$, $\frac{3}{2}$ $\frac{1}{2}$
128,051	4	5,90	102,72	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}F$	$\frac{5}{2}$ $-\frac{7}{2}$
128,025	4	5,90	102,74	$2p^{3} 2D^{\circ} - 3d' 2F$ $2p^{3} 2D^{\circ} - 3d' 2D$	$\frac{3}{2}$ $\frac{5}{2}$
127 ,473 127 ,444	4 4	5,90 5,90	103,16 103,18	$2p^{3} \cdot D = 3a \cdot D$ $2p^{3} \cdot 2D^{\circ} = 3d' \cdot 2D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
127,036	0	26,96	124,55	$2p^{4} {}^{4}P - 3d^{IV} {}^{4}P^{\circ}$	$^{1}/_{2}$ — $^{3}/_{2}$
126,985	0	26,89	121,50 $124,52$	$2p^{4} {}^{4}P - 3d^{IV} {}^{4}P^{\circ}$	$\frac{\frac{72}{3}}{2}^{-5}$
126,920	ő	26,89	124,57	$2p^{4} {}^{4}P - 3a^{IV} {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$
126,814	1	26,76	124,52	$2p^{4} {}^{4}P - 3d^{\text{IV}} {}^{4}P^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$
126,779	0	26,76	124,55	$2p^{4} ^{4}P - 3d^{\text{IV}} ^{4}P^{\circ}$	$^{5}/_{2}$ — $^{3}/_{2}$
126,608	1	5,90	103,82	$2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$	$^{3}/_{2}$ — $^{1}/_{2}$
126,557	2	5,90	103,86	$2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$	$\frac{5}{2} - \frac{3}{2}$
126,458	0	26,96	124,99	$2p^{4} {}^{4}P - 3d^{\dagger}V {}^{4}D^{\circ}$	1/2—1/2, 3/2
126,368	0	26,89	124,99	$\frac{2p^4}{4p}$ $\frac{4p}{3a^{\text{IV}}}$ $\frac{4D^{\circ}}{4p}$ $\frac{2p^4}{4p}$ $\frac{4p}{3a^{\text{IV}}}$ $\frac{4D^{\circ}}{4p}$	$\frac{3}{2}$ $\frac{1}{2}$, $\frac{3}{2}$, $\frac{5}{2}$
126,210	1	26,76	124,99		⁵ / ₂ — ³ / ₂ , ⁵ / ₂ , ⁷ / ₂
126,090 125,899	$0 \\ 2$	26,76 $8,98$	125,08 107,46	$^{2p^{4}}_{2p^{3}}^{^{2}P} - 3d^{\mathrm{IV}}_{}^{^{4}S}^{\circ}$ $^{2p^{3}}_{}^{^{2}P} - 3d''_{}^{^{2}D}$	$\frac{5}{2} - \frac{3}{2}$ $\frac{1}{2}, \frac{3}{2} - \frac{3}{2}, \frac{5}{2}$
125,655	3	0,00	98,82	$2p^3 {}^4S^{\circ} - 3d {}^4D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
125,428	3	00,0	98,84	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$	$^{3}/_{2}$ — $^{1}/_{2}$
125,286	5	0,00	98,96	$2p^3 ^4S^{\circ} - 3d ^4P$	3/25/2
125,216	4	0,00	99 ,01 99 ,04	$\frac{2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P}{2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P}$	$\frac{3}{2}$ $\frac{-3}{2}$ $\frac{3}{2}$ $\frac{-1}{2}$
125,178 121,263	$\frac{4}{0}$	$00,00 \\ 8,99$	111,23	$^{2}D^{2}P$ —4s ^{2}P	$\frac{\frac{1}{2}}{\frac{3}{2}}$
117,209	$\overset{\circ}{4}$	00,0	105,08	$2p^{3^{\circ}4}S^{\circ}-3p'''^{4}P$	$\frac{3}{2}$ $\frac{1}{2}$, $\frac{3}{2}$, $\frac{5}{2}$
117,876	0	5,90	111,08	$2p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	$\frac{3}{2}$ $\frac{1}{2}$
114,738	1	8,98	117,04	$\frac{2p^3}{2p^{\circ}} \frac{^2P^{\circ}}{-4d} \frac{^2D}{^2D}$	$\frac{1}{2}$ $\frac{3}{2}$
114,700 113,574	1 0	$8,99 \\ 5,90$	117,07 115,06	$2p^{3} {}^{2}P^{3} - 4a {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 4s' {}^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
113,374 $112,347$	Ö	5,90	116,25	$2p^{3} {}^{2}D^{\circ}$ $-4d^{2}P$	$^{5}/_{2}$ — $^{3}/_{2}$
112,186	0	5,90	116,58	$2p^{3} ^{2}D^{\circ} - 4d^{2}F$	$\frac{3}{2}$ _5/2
112,077	$\frac{0}{3}$	0,00 5,90	110,62 116,58	$\frac{2p^3}{2p^3} \frac{4S}{2} - 4s \frac{4P}{2F}$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
112,009		5,90 [5,90	116,38	$2p^{3} \cdot D - 4a \cdot F$ $2p^{3} \cdot 2D^{\circ} - 4a \cdot 2F$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
111 ,879	0	€0,00	110,81	$2p^3 {}^4S^{\circ}$ —4s 4P	³ / ₂ — ⁵ / ₂
111,552	0	$\frac{5}{5},90$	117,04	$\frac{2p^3}{2} \frac{^2D}{D} - 4d \frac{^2D}{2}$ $\frac{2p^3}{2} \frac{^2D}{D} - 4d \frac{^2D}{D}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
111.512	1	5,90	117 ,07	2p - D — 4a -D	2-72

λ, Α	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
1 10 ,921	0	8,98	120,76	$2p^{3} {}^{2}P^{\circ}$ — $4d' {}^{2}D$	¹ / ₂ , ³ / ₂ — ³ / ₂ , ⁵ / ₂
110,878	2	5,90	117,71	$2p^{3} {}^{2}D^{\circ} - 3p^{\text{IV}} {}^{2}F$	⁵ / ₂ — ⁷ / ₂
110,817	2	5,90	117,78	$2p^{3} {}^{2}D^{\circ} - 3p^{\text{IV}} {}^{2}F$	$\frac{3}{2}$ $\frac{5}{2}$
108,017	2	5,90	120,67	$2p^{3} 2D^{\circ} - 4d'^{2}F$	3/2, $5/2$ — $5/2$, $7/2$
107,934	2	5,90	120,76	$2p^{3} {}^{2}D^{\circ}-4d' {}^{2}D$	$3/_2$, $5/_2$ — $3/_2$, $5/_2$
106,490	1	0,00	116,42	$2p^{34}S^{\circ}-4d^{4}D$	$3/_2$ $-3/_2$, $5/_2$
106,399	1	0,00	116,52	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}D$	$^{3}/_{2}$ _1/2
106,302	1	00,00	116,62	$2p^{3} {}^{4}S^{\circ}$ —4d ${}^{4}P$	$^{3}/_{2}$ — $^{5}/_{2}$
106,278	1	0,00	116,65	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	$^{3}/_{2}$ — $^{3}/_{2}$
103,482	0	8,98	128,80	$2p^{3} {}^{2}P^{\circ} - 5d' {}^{2}D$	$^{1}/_{2}$, $^{3}/_{2}$ — $^{3}/_{2}$, $^{5}/_{2}$
100,945	0	5,90	128,71	$2p^{3} {}^{2}D^{\circ} - 5d' {}^{2}F$	3/2, $5/2$ — $5/2$, $7/2$
100,851	Ö	5,90	128,80	$2p^{3} 2D^{\circ} - 5d' 2D$	3/2, $5/2$ — $3/2$, $5/2$

Na VI, ground state $1s^2 \ 2s^2 \ 2p^2 \ ^3P_0$ Ionization potential $1388419 \ {\rm cm^{-1}}; \ 172,130 \ {\rm eV}$

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λ, Λ	I	E _H , eV	E _B , eV	Transition	J
638 ,21 632 ,90 528 ,730 494 ,382 494 ,160	0 0 0 7 3	39,75 39,75 43,41 0,23 0,23	59,17 59,34 66,86 25,31 25,32	$\begin{array}{c} 2p^{3} \ {}^{3}S^{\circ} - 2p^{4} \ {}^{3}P \\ 2p^{3} \ {}^{3}S^{\circ} - 2p^{4} \ {}^{3}P \\ 2p^{3} \ {}^{1}P^{\circ} - 2p^{4} \ {}^{1}D \\ \cdot 2p^{2} \ {}^{3}P - 2p^{3} \ {}^{3}D^{\circ} \\ 2p^{2} \ {}^{3}P - 2p^{3} \ {}^{3}D^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 2-3 \\ 2-2 \end{array} $
491,340 491,240 489,580 440,266 423,821	6 3 5 3 2	0,08 0,08 0,00 38,59 29,92	25,32 25,32 25,32 66,86 59,17	$\begin{array}{c} 2p^2 \ ^3P - 2p^3 \ ^3D^\circ \\ 2p^2 \ ^3P - 2p^3 \ ^3D^\circ \\ 2p^2 \ ^3P - 2p^3 \ ^3D^\circ \\ 2p^3 \ ^1D^\circ - 2p^4 \ ^1D \\ 2p^3 \ ^3P^\circ - 2p^4 \ ^3P \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 0-1 \\ 2-2 \\ 2, 1-2 \end{array} $
421,465 417,595 415,505 414,370 366,240	1 6 4 2 0	29,92 0,23 0,08 0,00 25,32	59,34 29,92 29,92 29,92 59,47	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 2p^{4} {}^{3}P \\ 2p^{2} {}^{3}P - 2p^{3} {}^{3}P^{\circ} \\ 2p^{2} {}^{3}P - 2p^{3} {}^{3}P^{\circ} \\ 2p^{2} {}^{3}P - 2p^{3} {}^{3}P^{\circ} \\ 2p^{3} {}^{3}D^{\circ} - 2p^{4} {}^{3}P \end{array}$	$\begin{array}{c} 0,\ 1,\ 2-1\\ 2-2,\ 1\\ 1-0,\ 1,\ 2\\ 0-1\\ 2-2 \end{array}$
366 ,110 364 ,477 363 ,774 362 ,444 361 ,250	4 3 2 4 8	25,31 25,32 25,32 9,21 4,38	59,47 59,34 59,40 43,41 38,59	$\begin{array}{c} 2p^{3} {}^{3}I)^{\circ} - 2p^{4} {}^{3}P \\ 2p^{3} {}^{3}D^{\circ} - 2p^{4} {}^{3}P \\ 2p^{3} {}^{3}D^{\circ} - 2p^{4} {}^{3}P \\ 2p^{2} {}^{1}S - 2p^{3} {}^{1}P^{\circ} \\ 2p^{2} {}^{1}D - 2p^{3} {}^{1}D^{\circ} \end{array}$	3-2 2-1 1-0 0-1 2-2
317,641 313,748 312,608 311,921 149,621	6 5 3 4 0	4,38 0,23 0,08 0,00 25,32	43,41 39,75 39,75 39,75 108,18	$2p^{2} ^{1}D - 2p^{3} ^{1}P^{\circ}$ $2p^{2} ^{3}P - 2p^{3} ^{3}S^{\circ}$ $2p^{3} ^{3}D^{\circ} - 3p ^{3}P$	2—1 2—1 1—1 0—1 2—1
149,442 146,398 141,040 140,833 138,693	$egin{pmatrix} 0 \\ 0 \\ 0 \\ 2 \\ 2 \end{pmatrix}$	25,31 43,41 29,92 29,92 38,59	108,27 128,10 117,82 117,95 128,10	$2p^3 ^3D^{\circ} - 3p ^3P$ $2p^3 ^1P^{\circ} - 3s' ^1D$ $2p^3 ^3P^{\circ} - 3s ^3P$ $2p^3 ^3P^{\circ} - 3s ^3P$ $2p^3 ^1D^{\circ} - 3s' ^1D$	$ \begin{array}{c} 3-2 \\ 1-2 \\ 0, 1, 2-1 \\ 1, 2-2 \\ 2-2 \end{array} $
137,589 134,532 134,135 134,021 133,825	0 3 0 1 2	39,75 9,21 25,32 25,32 25,31	132,40 101,36 117,75 117,82 117,95	$\begin{array}{c} 2p^3 \ {}^3S^{\circ} - 3d \ {}^3I) \\ 2p^2 \ {}^1S - 3s \ {}^1P^{\circ} \\ 2p^3 \ {}^3D^{\circ} - 3s \ {}^3P \\ 2p^3 \ {}^3D^{\circ} - 3s \ {}^3P \\ 2p^3 \ {}^3D^{\circ} - 3s \ {}^3P \end{array}$	1-2 0-1 1-0 1, 2-1 3-2
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λ, Α	I	E _{II} , eV	E_{B} , eV	Transition	J.
129,040 127,837 125,383 124,850 124,153	2 4 0 0 4	29,92 4,38 43,41 43,41 0,23	125,99 101,36 142,29 142,71 100,10	$\begin{array}{c} 2p^{3} {}^{3}P^{\circ} - 3s' {}^{3}D \\ 2p^{2} {}^{1}D - 3s {}^{1}P^{\circ} \\ 2p^{3} {}^{1}P^{\circ} - 3a' {}^{1}D \\ 2p^{3} {}^{1}P^{\circ} - 3a' {}^{1}P \\ 2p^{2} {}^{3}P - 3s {}^{3}P^{\circ} \end{array}$	0, 1, 2-1, 2, 3 2-1 1-2 1-1 2-1
124,059 123,970 123,929 123,868 123,744	4 2 5 3 4	{ 0,08 29,92 0,08 0,23 0,00 0,08	100,10 129,85 100,10 100,27 100,10 100,27	$2p^2 \ ^3P - 3s \ ^3P^{\circ} \ 2p^3 \ ^3P^{\circ} - 3d \ ^3P \ 2p^2 \ ^3P - 3s \ ^3P^{\circ} \ $	$ \begin{array}{r} 1 - 0 \\ 2 - 2 \\ 1 - 1 \\ 2 - 2 \\ 0 - 1 \\ 1 - 2 \end{array} $
123,134 122,018 121,913 121,773 121,004	4 3 3 4 1	25,32 12,83 12,83 12,83 29,92	125,99 114,44 114,53 114,64 132,38	$2p^3 ^3D^{\circ} - 3s' ^3D$ $2p^3 ^5S^{\circ} - 3s ^5P$ $2p^3 ^5S^{\circ} - 3s ^5P$ $2p^3 ^5S^{\circ} - 3s ^5P$ $2p^3 ^3P^{\circ} - 3d ^3D$	1, 2, 3—1, 2, 3 2—1 2—2 2—3 0—1
120,973 120,931 119,684	2 3 3	29,92 29,92 38,59	132,40 132,44 142,29	$\begin{array}{c} 2p^{3} ^{3}P^{\circ} - 3d ^{3}D \\ 2p^{3} ^{3}P^{\circ} - 3d ^{3}D \\ \left\{ \begin{array}{c} 2p^{3} ^{1}D^{\circ} - 3d' ^{1}D \\ 2p^{3} ^{1}D^{\circ} - 3d' ^{1}F \end{array} \right. \end{array}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-2 \\ 2-3 \\ \end{array} $
119,204 118,585 118,500 117,699 117,609	0 0 0 3 3 4	38,59 25,31 25,32 25,32 25,32 25,31	142,71 129,85 129,94 130,66 130,73 130,83	$2p^{3} \cdot 1D^{\circ} - 3a' \cdot 1P$ $2p^{3} \cdot 3D^{\circ} - 3d \cdot 3P$ $2p^{3} \cdot 3D^{\circ} - 3d \cdot 3P$ $2p^{3} \cdot 3D^{\circ} - 3d \cdot 3F$ $2p^{3} \cdot 3D^{\circ} - 3d \cdot 3F$ $2p^{3} \cdot 3D^{\circ} - 3d \cdot 3F$	2-1 3-2 2-1 1-2 2-3 3-4
117,491 115,780 115,729 114,666 113,125 112,950	0 2 4 4 4	25,31 25,31 9,21 4,38 4,38	132,40 132,44 117,33 113,99 114,15	$2p^3$ $^3D^{\circ}$ $-3d$ 3D $2p^3$ $^3D^{\circ}$ $-3d$ 3D $2p^2$ 1S $-3d$ $^1P^{\circ}$ $2p^2$ 1D $-3d$ $^3F^{\circ}$ $2p^2$ 1D $-3d$ $^1D^{\circ}$	2-2 3-3 0-1 2-2 2-2
112,448 112,009 111,793 111,725 110,750 109,896	3 1 1 2 5	29,92 29,92 4,38 4,38 29,92 4,38	140,17 140,60 115,30 115,36 141,86 117,20	$2p^3 \ ^3P^\circ - 3a' \ ^3P$ $2p^3 \ ^3P^\circ - 3a' \ ^3D$ $2p^2 \ ^1D - 3a' \ ^3D^\circ$ $2p^2 \ ^1D - 3a' \ ^3S$ $2p^3 \ ^3P^\circ - 3a' \ ^1F^\circ$	0, 1, 2-0, 1, 2 2-3 2-2 2-3 0, 1, 2-1 2-3
109,763 108,678 108,555 107,934 107,742	0 0 4 2 2	4,38 0,08 25,32 25,32 0,23	117,33 114,15 139,51 140,17 115,30	$2p^{2} ^{1}D - 3d ^{1}P^{\circ}$ $2p^{2} ^{3}P - 3d ^{1}D^{\circ}$ $2p^{3} ^{3}D^{\circ} - 3d' ^{3}F$ $2p^{3} ^{3}D^{\circ} - 3d' ^{3}P$ $2p^{2} ^{3}P - 3d ^{3}D^{\circ}$	$\begin{array}{c} 2-1\\ 1-2\\ 1,2,3-2,3,4\\ 1,2,3-0,1,2\\ 2-2\end{array}$
107,683 107,608 107,553 107,535 107,288	5 4 3 3 4	0,23 0,08 0,00 25,32 0,23	115,36 115,30 115,27 140,60 115,78	$\begin{array}{c} 2p^2 {}^{3}P - 3d {}^{3}D^5 \\ 2p^2 {}^{3}P - 3d {}^{3}D^6 \\ 2p^2 {}^{3}P - 3d {}^{3}D^6 \\ 2p^3 {}^{3}D^6 - 3d' {}^{3}D \\ 2p^2 {}^{3}P - 3d {}^{3}P^6 \end{array}$	$\begin{array}{c} 2-3 \\ 1-2 \\ 0-1 \\ 2, 3-1, 2, 3 \\ 2-2 \end{array}$
107,227 107,158 107,093 107,061 107,014	3 1 3 3 2	0,23 0,08 0,08 0,08 0,00	115,85 115,78 115,85 115,89 115,85	$2p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	2-1 1-2 1-1 1-0 0-1
106,580 106,125 106,077 106,040 103,210	0 4 3 3 2	12,83 12,83 12,83 12,83 0,23	129,16 129,65 129,71 129,75 120,36	$2p^3 {}^5S^{\circ} - 3d {}^5D$ $2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^3 {}^5S^{\circ} - 3d {}^5P$ $2p^2 {}^3P - 3p {}^3S^{\circ}$	2-2, 3 2-3 2-2 2-1 2-1
103,078 103,002	1 0	0,08 00,00	120,36 120,36	$\frac{2p^2}{2p^2} \frac{^3P}{^3P} - \frac{^3S}{^3P} \frac{^3S}{^3S}$	1—1 0—1

$oldsymbol{\lambda},~\dot{f A}$	I	$E_{ m H}$, eV	$E_{_{f B}},\;\;{ m eV}$	Transition	J
100,590 100,519 100,469	1 3 2	0,23 0,23 0,08	123,48 123,57 123,48	$\begin{array}{c} 2p^2 \ ^3P - 3p \ ^3D^{\circ} \\ 2p^2 \ ^3P - 3p \ ^3D^{\circ} \\ 2p^2 \ ^3P - 3p \ ^3D^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 2-3 \\ 0, 1-1, 2 \end{array} $
99,680 99,617 99,500 99,004 98,309	1 1 0 0 0	0,23 0,23 0,08 25,31 29,92	124,61 124,68 124,68 150,53 156,04	$2p^2 \ ^3P - 3p \ ^3P^\circ \ 2p^2 \ ^3P - 3p \ ^3P^\circ \ 2p^2 \ ^3P - 3p \ ^3P^\circ \ 2p^3 \ ^3D^\circ - 4s \ ^3P \ 2p^3 \ ^3P^\circ - 4d \ ^3D$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-2 \\ 3-2 \\ 2-1, 2, 3 \end{array} $
97,636 96,475 96,307 96,196 96,124	0 3 1 1 0	29,92 4,38 0,23 0,08 0,00	156,90 132,89 128,96 128,96 128,96	$2p^{3} ^{3}P^{\circ} - ^{3}p^{\text{IV}} ^{3}P$ $2p^{2} ^{1}D - ^{3}p' ^{1}F^{\circ}$ $2p^{2} ^{3}P - ^{3}p' ^{3}D^{\circ}$ $2p^{2} ^{3}P - ^{3}p' ^{3}D^{\circ}$ $2p^{2} ^{3}P - ^{3}p' ^{3}D^{\circ}$	$\begin{array}{c} 0, 1, 2 - 0, 1, 2 \\ 2 - 3 \\ 2 - 1, 2, 3 \\ 1 - 1, 2 \\ 0 - 1 \end{array}$
95,933 95,319 95,263 95,182 94,827	3 0 1 1 0	4,38 25,32 25,32 25,31 25,32	133,62 155,39 155,46 155,56 156,04	$2p^{2} ^{1}D - 3p' ^{1}D^{\circ}$ $2p^{3} ^{3}D^{\circ} - 4d ^{3}F$ $2p^{3} ^{3}D^{\circ} - 4d ^{3}F$ $2p^{3} ^{3}D^{\circ} - 4d ^{3}F$ $2p^{3} ^{3}D^{\circ} - 4d ^{3}D$	$\begin{array}{c} 2-2\\ 1-2\\ 2-3\\ 3-4\\ 1, 2, 3-1, 2, 3 \end{array}$
94,208 91,836 91,737 91,475 91,414	1 0 0 0	25,31 0,23 0,08 4,38 29,92	156,90 135,23 135,23 139,93 165,57	$2p^3 ^3D^{\circ} - 3p^{\text{IV}} ^3P$ $2p^2 ^3P - 4s ^3P^{\circ}$ $2p^2 ^3P - 4s ^3P^{\circ}$ $2p^2 ^1D - 4d ^3F^{\circ}$ $2p^3 ^3P^{\circ} - 4d' ^3P$	$ \begin{array}{c} 3-2\\2-2\\1-2\\2-2\\2-2\\0,1,2-0,1,2 \end{array} $
91,268 90,746 90,468 88,460 88,387	1 0 3 1	4,38 12,83 4,38 25,32 25,32	140,22 149,45 141,42 165,46 165,57	$2p^{2} ^{1}D - 4d ^{1}D^{\circ}$ $2p^{3} ^{5}S^{\circ} - 4s ^{5}P$ $2p^{2} ^{1}D - 4d ^{1}F^{\circ}$ $2p^{3} ^{3}D^{\circ} - 4d' ^{3}F$ $2p^{3} ^{3}D^{\circ} - 4d' ^{3}P$	$\begin{array}{c} 2-2\\ 2-3\\ 2-3\\ 2-3\\ 1,\ 2,\ 3-2,\ 3,\ 4\\ 1,\ 2,\ 3-0,\ 1,\ 2\\ \end{array}$
88,340 88,270 88,246 88,223 88,143	1 3 2 1 2	0,23 0,23 25,32 0,08 0,00 0,23	140,57 140,68 165,76 140,57 140,53 140,88	$2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{3} {}^{3}D^{\circ} - 4d' {}^{3}D$ $2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $2p^{2} {}^{3}P - 4d {}^{3}P^{\circ}$	$\begin{array}{c} 2-2 \\ 2-3 \\ 1, 2, 3-1, 2, 3 \\ 1-2 \\ 0-1 \\ 2-2 \end{array}$
88,038 87,211 87,141 83,639 81,584	1 7 1 1	$\begin{array}{c} 0,08 \\ 12,83 \\ 12,83 \\ 4,38 \\ 4,38 \\ 25,32 \\ 0,23 \end{array}$	140,88 154,99 154,99 152,61 177,27 152,27	$2p^{2} {}^{3}P - 4d {}^{3}P^{\circ}$ $2p^{3} {}^{5}S^{\circ} - 4d {}^{5}P$ $2p^{3} {}^{5}S^{\circ} - 4d {}^{5}P$ $2p^{2} {}^{1}D - 5d {}^{1}F^{\circ}$ $2p^{3} {}^{3}D^{\circ} - 5d' {}^{3}F$ $2p^{2} {}^{3}P - 5d {}^{3}D^{\circ}$	$\begin{array}{c} 1-1,\;2\\ 2-3\\ 2-2\\ 2-3\\ 1,\;2,\;3-2,\;3,\;4\\ 2-2\\ \end{array}$
81,543 81,498 80,645 80,345	1 2 0 0	0,23 0,08 0,23 12,83 4,38	152,27 152,27 152,35 166,56 158,69	$2p^2 ^3P - 5d ^3D^{\circ}$ $2p^2 ^3P - 5d ^3D^{\circ}$ $2p^2 ^3P - 5d ^3P^{\circ}$ $2p^3 ^5S^{\circ} - 5d ^5P$ $2p^2 ^1D - 6d ^1F^{\circ}$	$ \begin{array}{r} 2-3 \\ 1-2 \\ 2-2 \\ 2-3 \\ 2-3 \end{array} $

Unclassified Lines of Sodium

λ, Α	1	Expected assignment	λ, Λ	I	Expected assignment
1787,4	4	_	1658,7	40	
1770,8	6	_	138,628	2	_
1749,3	8	_	128,112	$\bar{3}$	_
1698,9	10	_	110,085	$\overset{\circ}{2}$	
1669,3	40		95,551	$\frac{1}{2}$	_
1668,7	40	_	87,524	$\overline{2}$	_

MAGNESIUM, Z = 12 Mg I, ground state $1s^2 2s^2 2p^6 3s^{2} ^1S_0$

Ionization potential $61671,02 \text{ cm}^{-1}$; 7,646 eV

				· ·	
λ,.\	1	E _H , eV	$E_{ m B}$, eV	Transition	J
26392,9	5	6,42	6,59	$4p^{1}P^{\circ}-4d^{1}D$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-3 \\ 1-2 \\ 0-1 \end{array} $
17108,66	30	5,39	6,12	$4s^{1}S-4p^{1}P^{\circ}$	
15765,84	10	5,93	6,72	$4p^{3}P^{\circ}-4d^{3}D$	
15748,99	8	5,93	6,72	$4p^{3}P^{\circ}-4d^{3}D$	
15740,71	6	5,93	6,72	$4p^{3}P^{\circ}-4d^{3}D$	
15047,70	25	5,11	5,93	$4s {}^{3}S - 4p {}^{3}P^{\circ}$	$ \begin{array}{c} 1-0 \\ 1-1 \\ 1-2 \\ - \\ 2-3 \end{array} $
15040,24	30	5,11	5,93	$4s {}^{3}S - 4p {}^{3}P^{\circ}$	
15024,99	35	5,11	5,93	$4s {}^{3}S - 4p {}^{3}P^{\circ}$	
14877,62	28	5,95	6,78	$3d {}^{3}D - 4f {}^{3}F^{\circ}$	
12083,66	30	5,75	6,78	$3d {}^{1}D - 4f {}^{1}F^{\circ}$	
11828,18	45	4,35	5,39	$3p ^{1}P^{\circ}-4s ^{1}S$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 3 - 2 \\ 2 - 3 \\ 1 - 2 \end{array} $
11033,661	14	5,95	7,07	$3d ^{3}D-6p ^{3}P^{\circ}$	
11032,103	15	5,95	7,07	$3d ^{3}D-6p ^{3}P^{\circ}$	
10965,450	28	5,93	7,06	$4p ^{3}P^{\circ}-5d ^{3}D$	
10957,304	27	5,93	7,06	$4p ^{3}P^{\circ}-5d ^{3}D$	
10953,320	25	5,93	7,06	$4p ^3P^{\circ} - 5d ^3D$	0-1
10811,085	35	5,95	7,09	$3d ^3D - 5f ^3F^{\circ}$	-
9993,209	18	5,93	7,17	$4p ^3P^{\circ} - 7s ^3S$	2-1
9986,475	17	5,93	7,17	$4p ^3P^{\circ} - 7s ^3S$	1-1
9983,20	15	5,93	7,17	$4p ^3P^{\circ} - 7s ^3S$	0-1
9505,433 9503,108 9502,454 9438,783 9432,764	5 7 8 20 19	5,95 5,95 5,95 5,93 5,93	7,25 7,25 7,25 7,25 7,25 7,25	$3d\ ^{3}D - 7p\ ^{3}P^{c} \ 3d\ ^{3}D - 7p\ ^{3}P^{c} \ 3d\ ^{3}D - 7p\ ^{3}P^{c} \ 4p\ ^{3}P^{c} - 6d\ ^{3}D \ 4p\ ^{3}P^{c} - 6d\ ^{3}D$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 3 - 2 \\ 2 - 3 \\ 1 - 2 \end{array} $
9429,814	47	5,93	7,25	$4p\ ^{3}P^{\circ}-6d\ ^{3}D$	0—1
9414,964	25	5,95	7,26	$3d\ ^{3}D-6f\ ^{3}F^{\circ}$	—
9255,778	30	5,75	7,09	$3d\ ^{1}D-5f\ ^{1}F^{\circ}$	2—3
9246,499	12	5,75	7,09	$3d\ ^{1}D-6p\ ^{1}P^{\circ}$	2—1
8997,156	10	5,93	7,31	$4p\ ^{3}P^{\circ}-8s\ ^{3}S$	2—1
8991,692 8989,026 8923,569 8806,757 8736,021	9 7 20 50 17	5,93 5,93 5,39 4,35 5,95	7,31 7,31 6,78 5,75 7,36	$4p ^3P^{\circ} - 8s ^3S$ $4p ^3P^{\circ} - 8s ^3S$ $4s ^1S - 5p ^1P^{\circ}$ $3p ^1P^{\circ} - 3d ^1D$ $3d ^3D - 7f ^3F^{\circ}$	1-1 0-1 0-1 1-2
8717,825	13	5,93	7,36	4p 3P°-7d 3D	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 0 - 1 \\ 2 - 1 \\ 1 - 1 \end{array} $
8712,689	12	5,93	7,36	4p 3P°-7d 3D	
8710,175	10	5,93	7,36	4p 3P°-7d 3D	
8473,694	7	5,93	7,40	4p 3P°-9s 3S	
8468,845	5	5,93	7,40	4p 3P°-9s 3S	
8466,483	2	5,93	7,40	4p 3P°—9s 3S	0-1 $ 2-3$ $1-2$ $0-1$
8346,120	15	5,95	7,43	3d 3D—8f 3F°	
8310,264	10	5,93	7,42	4p 3P°—8d 3D	
8305,596	9	5,93	7,42	4p 3P°—8d 3D	
8303,313	7	5,93	7,42	4p 3P°—8d 3D	
8213,034 8209,839 8159,132 8154,644 8098,724	20 10 2 1 10	5,75 5,75 5,93 5,93 5,95	7,26 7,26 7,45 7,45 7,45 7,48	$3d ^{1}D - 6f ^{1}F^{\circ}$ $3d ^{1}D - 7p ^{1}P^{\circ}$ $4p ^{3}P^{\circ} - 10s ^{3}S$ $4p ^{3}P^{\circ} - 10s ^{3}S$ $3d ^{3}D - 9f ^{3}F^{\circ}$	2-3 2-1 2-1 1-1
8054,232	7	5,93	7 ,47	4p 3P°—9d 3I)	$ \begin{array}{c} 2-1, \ 2, \ 3 \\ 1-1, \ 2 \\ 0-1 \end{array} $
8049,854	5	5,93	7 ,47	4p 3P°—9d 3I)	
8047,73	3	5,93	7 ,47	4p 3P°—9d 3I)	

λ, Å	I	E _H . eV	E _B , eV	Transition	J
7930,806 7881,667	7 2	5,95 5,93	7,51 7,50	3d ³ D—10f ³ F° 4p ³ P°—10d ³ D	_ 2— 1, 2, 3
7811,135 7759,297 7746,343 7722,614 7691,550	3 1 1 1 15	5,95 5,93 4,35 5,95 5,75	7,53 7,53 5,95 7,55 7,36	3d ³ D—11f ³ F° 4p ³ P°—11d ³ D 3p ¹ P°—3d ³ D 3d ³ D—12f ³ F° 3d ¹ D—7f ¹ F°	2-1, 2, 3 1-2 - 2-3
7690,165 7659,902 7659,152 7657,603 7486,225	8 17 19 20 5	5,75 5,11 5,11 5,11	7,36 6,73 6,73 6,73	3d ¹ D-8p ¹ P° 4s ³ S-5p ³ P° 4s ³ S-5p ³ P° 4s ³ S-5p ³ P°	$ \begin{array}{c} 2-1 \\ 1-0 \\ 1-1 \\ 1-2 \\ - \end{array} $
7387,685 7387,004 7291,060 7193,172 7060,409	12 5 10 10 8	5,75 5,75 5,39 5,75 5,75	7,43 7,43 7,09 7,48 7,51	$3d\ ^{1}D - 8f\ ^{1}F^{\circ}$ $3d\ ^{1}D - 9p\ ^{1}P^{\circ}$ $4s\ ^{1}S - 6p\ ^{1}P^{\circ}$ $3d\ ^{1}D - 9f\ ^{1}F^{\circ}$ $3d\ ^{1}D - 10f\ ^{1}F^{\circ}$	2-3 2-1 0-1 2-3 2-3
6972,674 6965,404 6894,898 6630,834 6406,619	6 4 2 6	5,75 5,75 5,39	7,53 7,55 7,55 7,26	3d ¹ D-11f ¹ F° 3d ¹ D-12f ¹ F° 4s ¹ S-7p ¹ P	2-3 2-3 0-1
6319,493 6319,236 6318,716 6256,750 6208,440	7 9 10 7 3	5,11 5,11 5,11 —	7,07 7,07 7,07 —	4s 3S-6p 3P° 4s 3S-6p 3P° 4s 3S-6p 3P°	1-0 1-1 1-2 -
5839,820 5785,560 5785,312 5711,0880 5528,4047	3 4 5 30 40	 5,11 5,11 4,35 4,35	7,25 7,25 6,52 6,59	$-4s {}^3S - 7p {}^3P^{\circ} \ 4s {}^3S - 7p {}^3P^{\circ} \ 3p {}^1P^{\circ} - 5s {}^1S \ 3p {}^1P^{\circ} - 4d {}^1D$	$ \begin{array}{c} -\\ 1-1\\ 1-2\\ 1-0\\ 1-2 \end{array} $
5509,597 5345,977 5183,6042 5172,6843 5167,3216	2 1 45 44 42	5,11 5,11 2,72 2,71 2,71	7,36 7,43 5,11 5,11 5,11	$4s {}^{3}S - 8p {}^{3}P^{\circ}$ $4s {}^{3}S - 9p {}^{3}P^{\circ}$ $3p {}^{3}P^{\circ} - 4s {}^{3}S$ $3p {}^{3}P^{\circ} - 4s {}^{3}S$ $3p {}^{3}P^{\circ} - 4s {}^{3}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4730,0285 4702,9909 4621,299 4571,0956 4409,84	10 30 3 28 1	4,35 4,35 2,71 0;00 7,19	6,97 6,98 5,39 2,71 10,00	$3p ^{1}P^{\circ} - 6s ^{1}S$ $3p ^{1}P^{\circ} - 5d ^{1}D$ $3p ^{3}P^{\circ} - 4s ^{1}S$ $3s^{2} ^{1}S - 3p ^{3}P^{\circ}$ $6d ^{1}D - 3d ^{1}D^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 1 - 2 \\ 1 - 0 \\ 0 - 1 \\ 2 - 2 \end{array} $
4380,375 4354,529 4351,9056 4212,497 4205,096	$\begin{array}{c} 6 \\ 6 \\ 20 \\ 2 \\ 2 \end{array}$	4,35 4,35 4,35 —	7,18 7,19 7,19 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—0 1—2 —
4177,109 4167,2712 4165,101 4099,77 4081,833	2 15 4 2 2	4,35 4,35 6,98 2,72	7,31 7,31 10,00 5,75	$\begin{array}{c} - \\ 3p ^1P^{\circ} - 7d ^1D \\ 3p ^1P^{\circ} - 8s ^1S \\ 3d ^1D^{\circ} - 3d ^1D^{\circ} \\ 3p ^3P^{\circ} - 3d ^1D \end{array}$	$\begin{array}{c} - \\ 1-2 \\ 1-0 \\ 2-2 \\ 2-2 \end{array}$
4075,059 4057,5052 4054,689 3986,7533 3984,212	3 10 2 8 1	2,71 4,35 4,35 4,35 4,35	5,75 7,40 7,40 7,45 7,46	$3p ^{3}P^{c} - 3d ^{1}D$ $3p ^{1}P^{o} - 8d ^{1}D$ $3p ^{1}P^{o} - 9s ^{1}S$ $3p ^{1}P^{o} - 9d ^{1}D$ $3p ^{1}P^{o} - 10s ^{1}S$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-0 \\ 1-2 \\ 1-0 \end{array} $
3938 ,400 246	6	4,35	7,49	$3p ^1P^{\circ}$ — $10d ^1D$	1-2

λ, Α	I	$E_{_{ m II}},{ m eV}$	E _B , eV	Transition	J
3903,859 3899,542 3898,120 3895,572	4 1 4 3	4,35 7,18 7,18 7,18 7,18	7,52 10,35 10,35 10,36	$3p^{1}P^{\circ}-11d^{1}D$ $3p^{2}^{3}P-3d^{3}D^{\circ}$ $3p^{2}^{3}P-3d^{3}D^{\circ}$ $3p^{2}^{3}P-3d^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-1 \\ 2-2 \\ 2-3 \end{array} $
3893,304 3891,906 3890,241 3878,306 3858,860	2 2 3 3 2	7,17 7,17 7,17 4,35 4,35	10,35 10,35 10,35 7,54 7,56	$3p^2$ 3P $-3d$ $^3D^\circ$ $3p^2$ 3P $-3d$ $^3D^\circ$ $3p^2$ 3P $-3d$ $^3D^\circ$ $3p$ $^1P^\circ$ $-12d$ 1D $3p$ $^1P^\circ$ $-13d$ 1D	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 1 - 2 \\ 1 - 2 \end{array} $
3854,965 3853,960 3848,914 3838,2943 3838,2918	1 2 1 20 20	2,72 2,72 2,71 2,72 2,72	5,93 5,93 5,93 5,95 5,95	3p 3P°-4p 3P° 3p 3P°-4p 3P° 3p 3P°-4p 3P° 3p 3P°-3d 3D 3p 3P°-3d 3D	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-1 \\ 2-2 \\ 2-3 \end{array} $
3832,3037 3832,2996 3829,3549 3627,63 3515,602	20 18 36 4 4	2,71 2,71 2,71 6,59	5,95 5,95 5,95 10,00	3p 3P°—3d 3D 3p 3P°—3d 3D 3p 3P°—3d 3D 4d 1D—3d 1D° —	$ \begin{array}{r} 1-2 \\ 1-1 \\ 0-1 \\ 2-3 \\ \end{array} $
3453,616 3444,409 3336,674 3332,146 3329,919	3 2 20 19 17		- 6,43 6,43 6,43	- 3p ³ P°-5s ³ S 3p ³ P°-5s ³ S 3p ³ P°-5s ³ S	2—1 1—1 0—1
3299,050 3237,266 3201,796 3197,625 3126,380	4 3 3 2 2		- 6,59 6,59	3p 3P°-4d 1D 3p 3P°-4d 1D -	
3096,890 3092,984 3091,065 2941,995 2938,473	24 22 20 13 12	2,72 2,71 2,71 2,72 2,72	6,72 6,72 6,72 6,93 6,93	3p 3P°—4d 3D 3p 3P°—4d 3D 3p 3P°—4d 3D 3p 3P°—6s 3S 3p 3P°—6s 3S	2—2 1—2 0—1 2—1 1—1
2936,739 2915,453 2906,360 2902,923 2852,127	10 3 4 2 50	2,71 5,75 2,72 2,71 0,00	6,93 10,00 6,98 6,98 4,35	$3p \ ^{3}P^{\circ}-6s \ ^{3}S$ $3d \ ^{1}D-3d \ ^{1}D^{\circ}$ $3p \ ^{3}P^{\circ}-5d \ ^{1}D$ $3p \ ^{3}P^{\circ}-5d \ ^{1}D$ $3s^{2} \ ^{1}S-3p \ ^{1}P^{\circ}$	0-1 $2-2$ $2-2$ $1-2$ $0-1$
2851,660 2848,342 2846,716 2842,647 2811,781	16 14 12 6 1	2,72 2,71 2,71 — 5,95	7,06 7,06 7,06 — 10,35	3p 3P°—5d 3D 3p 3P°—5d 3D 3p 3P°—5d 3D ————————————————————————————————————	$ \begin{array}{c} 2-3 \\ 1-2 \\ 0-1 \\ -1 \\ 1, 2-1 \end{array} $
2811,112 2809,761 2782,972 2781,416 2781,228	2 3 18 18 8	5,95 5,95 2,72 2,71 2,72	10,35 10,36 7,17 7,17 7,17	$3d ^3D - 3d^3 D^{\circ}$ $3d ^3D - 3d ^3D^{\circ}$ $3p ^3P^{\circ} - 3p^2 ^3P$ $3p ^3P^{\circ} - 3p^2 ^3P$ $3p ^3P^{\circ} - 7s ^3S$	$\begin{array}{c} 1 , 2 , 3-2 \\ 2 , 3-3 \\ 2-1 \\ 1-0 \\ 2-1 \end{array}$
2779 ,831	20	$\left\{\begin{array}{cc} 2,72\\2,71\end{array}\right.$	7,18 7,17	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$	2—2 1—1
2778,270	18	$\begin{cases} 2.71 \\ 2.71 \\ 2.71 \end{cases}$	7,17 7,17 7,18	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3p \ ^{3}P^{\circ} - 7s \ ^{3}S$ $3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$	0-1 $1-1$ $1-2$
2776,690 2768,339	18 7	$ \left\{ \begin{array}{l} 2,71 \\ 2,71 \\ 2,72 \end{array} \right. $	7,18 7,17 7,19	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$0-1 \\ 2-2$
2765,222	5	2,71	7,19	$3p \ ^{3}P^{\circ}-6d \ ^{1}D$ $3p \ ^{3}P^{\circ}-6d \ ^{3}D$	$ \begin{array}{r} $
2736,542 2733,493	12 10	$egin{array}{c} 2,72 \ 2,71 \end{array}$	7,25 7,25	$3p ^{9}P - 6d ^{3}D$	$\frac{2-3}{1-1}$, 2

λ, Λ	I	$E_{ m H}^{},~{ m eV}$	$E_{_{ m B}},{ m eV}$	Transition	J
2731 ,993	8	2,71	7,25	3p ³ P°-6d ³ D	0—1
2698 ,145	6	2,72	7,31	3p ³ P°-8s ³ S	2—1
2695 ,181	5	2,71	7,31	3p ³ P°-8s ³ S	1—1
2693,723	3	2,71	7,31	$3p \ ^{3}P^{\circ} - 8s \ ^{3}S$	0-1 $2-2$ $1-2$ $2-3$ $1-1$, 2
2692,45	2	2,72	7,32	$3p \ ^{3}P^{\circ} - 7d \ ^{1}D$	
2689,49	1	2,71	7,32	$3p \ ^{3}P^{\circ} - 7d \ ^{1}D$	
2672,460	10	2,72	7,36	$3p \ ^{3}P^{\circ} - 7d \ ^{3}D$	
2669,553	8	2,71	7,36	$3p \ ^{3}P^{\circ} - 7d \ ^{3}D$	
2668,124 2649,062 2646,206 2644,801 2632,873	6 4 3 2 8	2,71 2,72 2,71 2,71 2,72	7,36 7,40 7,40 7,40 7,42	3p 3P°—7d 3D 3p 3P°—9s 3S 3p 3P°—9s 3S 3p 3P°—9s 3S 3p 3P°—9s 3S 3p 3P°—8d 3D	0-1 2-1 1-1 0-1 2-3
2630,053	6	2,71	7,42	$3p ^3P^{\circ} - 8d ^3D$	1-1, 2
2628,664	3	2,71	7,42	$3p ^3P^{\circ} - 8d ^3D$	0-1
2617,513	3	2,72	7,45	$3p ^3P^{\circ} - 10s ^3S$	2-1
2614,726	2	2,71	7,45	$3p ^3P^{\circ} - 10s ^3S$	1-1
2613,357	1	2,71	7,45	$3p ^3P^{\circ} - 10s ^3S$	0-1
2606,621	5	2,72	7,47	$3p \ ^3P - 9d \ ^3D$	2-1, 2, 3
2603,854	4	2,71	7,47	$3p \ ^3P^{\circ} - 9d \ ^3D$	1-1, 2
2602,495	2	2,71	7,47	$3p \ ^3P^{\circ} - 9d \ ^3D$	0-1
2595,973	2	2,72	7,49	$3p \ ^3P^{\circ} - 11s \ ^3S$	2-1
2593,231	1	2,71	7,49	$3p \ ^3P^{\circ} - 11s \ ^3S$	1-1
2591,891 2588,285 2585,558 2584,216 2580,587	0 3 2 1 1	2,71 2,72 2,71 2,71 2,72	7,49 7,50 7,50 7,50 7,50 7,52	3p 3P°—11s 3S 3p 3P°—10d 3D 3p 3P°—10d 3D 3p 3P°—10d 3D 3p 3P°—10d 3D 3p 3P°—12s 3S	0-1 2-1, 2, 3 1-1, 2 0-1 2-1
2577,888	0	2,71	7,52	$3p \ ^{3}P^{\circ}-12s \ ^{3}S$ $3p \ ^{3}P^{\circ}-11d \ ^{3}D$ $3p \ ^{3}P^{\circ}-11d \ ^{3}D$ $3p \ ^{3}P^{\circ}-11d \ ^{3}D$ $3p \ ^{3}P^{\circ}-12d \ ^{3}D$	1-1
2574,945	2	2,72	7,53		2-1, 2, 3
2572,248	1	2,71	7,53		1-1, 2
2570,908	0	2,71	7,53		0-1
2564,937	1	2,72	7,55		2-1, 2, 3
2562,259	1	2,71	7,55	$\begin{array}{c} 3p \ ^{3}P^{\circ}-12d \ ^{3}D \\ 3p \ ^{3}P^{\circ}-12d \ ^{3}D \\ 3p \ ^{3}P^{\circ}-13d \ ^{3}D \\ - \\ 3s^{2} \ ^{1}S-4p \ ^{1}P^{\circ} \end{array}$	1-1, 2
2560,941	0	2,71	7,55		0-1
2557,226	0	2,72	7,56		2-1, 2, 3
2395,150	4	—	—		-
2025,824	9	0,00	6,12		0-1
1827,97	8	0,00	6,78	$3s^{2} {}^{1}S - 5p {}^{1}P^{\circ}$ $3s^{2} {}^{1}S - 6p {}^{1}P^{\circ}$ $3s^{2} {}^{1}S - 7p {}^{1}P^{\circ}$ $3s^{2} {}^{1}S - 8p {}^{1}P^{\circ}$ $3s^{2} {}^{1}S - 9p {}^{1}P^{\circ}$	0-1
1747,81	5	0,00	7,09		0-1
1707,10	3	0,00	7,26		0-1
1683,51	1	0,00	7,36		0-1
1668,57	0	0,00	7,43		0-1

Mg II, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^{\ 2}S_{1/2}$ Ionization potential 121267,41 cm $^{-1}$; 15,034 eV

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
21432,11	 5	11,50	12,08	5s ² S - 5p ² P°	1/2-1/2
21368,91	7	11,50	12,08	$5s {}^{2}S - 5p {}^{2}P^{\circ}$	1/2 - 3/2
18622,68	25	12,86	13,52	$5g^{2}G-6h^{2}H^{\circ}$	_
18574,80	20	12,86	13,52	$5f^2F^\circ$ — $6g^2G$	_
17717 ,72	15	12,82	13,52	$5d^2D-6f^2F^\circ$	_
11620,14	3	12,86	13,92	$5g^2G$ — $7h^2H^\circ$	_
11600,56	3	12,86	13,92	$5f^{2}F^{\circ}-7g^{2}G$	_
248	อ	12,00	15,92	3/ F -1g -G	_

λ, Α	I	$E_{\rm fl}$, eV	E _B , eV	Transition	J
11256,35 11255,93 10951,78	4 5 10	12,82 12,82 8,86	13,92 13,92 10,00	$5d\ ^{2}D-7f\ ^{2}F^{\circ} \ 5d\ ^{2}D-7f\ ^{2}F^{\circ} \ 3d\ ^{2}D-4\rho\ ^{2}P^{\circ}$	3/2 - 5/2 $5/2 - 7/2$ $3/2 - 1/2$
10915,27 10914,23 10392,23 10391,76 10092,16	7 10 6 5 14	8,86 8,86 11,63 11,63 11,63	10,00 10,00 12,82 12,82 12,86	$3d^{2}D-4p^{2}P^{\circ} \ 3d^{2}D-4p^{2}P^{\circ} \ 4f^{2}F^{\circ}-5d^{2}D \ 4f^{2}F^{\circ}-5d^{2}D \ 4f^{2}F^{\circ}-5g^{2}G$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \\ - \end{array} $
9632,435 9631,888 9340,544 9327,545 9244,266	11 12 10 10 13	11,57 11,57 12,86 12,86 8,65	12,86 12,86 14,18 14,18 10,00	$4d\ ^{2}D-5f\ ^{2}F^{\circ}\ 4d\ ^{2}D-5f\ ^{2}F^{\circ}\ 5g\ ^{2}G-8h\ ^{2}H^{\circ}\ 5f\ ^{2}F^{\circ}-8g\ ^{2}G\ 4s\ ^{2}S-4p\ ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ - \\ - \\ 1/2 - 1/2 \end{array} $
9218,248 8835,082 8824,323 8745,657 8734,990	14 11 10 11 10	8,65 12,08 12,08 12,08 12,08	10,00 13,49 13,49 13,50 13,50	$4s^2S - 4p^2P^{\circ} \ 5p^2P^{\circ} - 7s^2S \ 5p^2P^{\circ} - 7s^2S \ 5p^2P^{\circ} - 6d^2D \ 5p^2P^{\circ} - 6d^2D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
8234,639 8233,194 8222,924 8213,989 8120,434	11 7 7 10 8	10,00 12,86 12,86 10,00 11,57	11,50 14,36 14,36 11,50 13,09	$4p^{2}P^{\circ}-5s^{2}S$ $5g^{2}G-9h^{2}H^{\circ}$ $5f^{2}F^{\circ}-9g^{2}G$ $4p^{2}P^{\circ}-5s^{2}S$ $4d^{2}D-6p^{2}P^{\circ}$	3/2 - 1/2
8115,220 7896,368 7877,051 7790,978 7786,500	9 13 12 4 5	11,57 10,00 10,00 11,50 11,50	13,10 11,57 11,57 13,09 13,10	$4d\ ^{2}D-6p\ ^{2}P^{\circ} \ 4p\ ^{2}P^{\circ}-4d\ ^{2}D \ 4p\ ^{2}P^{\circ}-4d\ ^{2}D \ 5s\ ^{2}S-6p\ ^{2}P^{\circ} \ 5s\ ^{2}S-6p\ ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
7589,558 7580,764 7166,676 6819,270 6812,860	3 4 2 8 7	12,86 12,86 12,86 12,08 12,08	14,49 14,49 14,58 13,90 13,90	$5g^{2}G-10h^{2}H^{\circ}$ $5f^{2}F^{\circ}-10g^{2}G$ $5f^{2}F^{\circ}-11g^{2}G$ $5p^{2}P^{\circ}-8s^{2}S$ $5p^{2}P^{\circ}-8s^{2}S$	- $ 3/2$ $1/2$ $1/2$
6787,851 6781,451 6620,569 6620,440 6545,973	8 7 6 5 11	12,08 12,08 11,63 11,63 11,63	13,91 13,91 13,50 13,50 13,52	$5p {}^{2}P^{\circ}$ — $7d {}^{2}D$ $5p {}^{2}P^{\circ}$ — $7d {}^{2}D$ $4f {}^{2}F^{\circ}$ — $6d {}^{2}D$ $4f {}^{2}F^{\circ}$ — $6d {}^{2}D$ $4f {}^{2}F^{\circ}$ — $6g {}^{2}G$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
6346,962 6346,737 5943,499 5938,629 5928,233	9 10 4 3 4	11,57 11,57 12,08 12,08 12,08	13,52 13,52 14,17 14,17 14,18	$\begin{array}{c} 4d\ ^2D - 6f\ ^2F^\circ \\ 4d\ ^2D - 6f\ ^2F^\circ \\ 5p\ ^2P^\circ - 9s\ ^2S \\ 5p\ ^2P^\circ - 9s\ ^2S \\ 5p\ ^2P^\circ - 8d\ ^2D \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
5923,366 5918,158 5916,429 5464,136 5460,019	3 6 7 2 1	12,08 11,57 11,57 12,08 12,08	14,18 13,66 13,66 14,35 14,35	$5p ^{2}P^{\circ}$ —8 $d ^{2}D$ $4d ^{2}D$ —7 $p ^{2}P^{\circ}$ $4d ^{2}D$ —7 $p ^{2}P^{\circ}$ $5p ^{2}P^{\circ}$ —10 $s ^{2}S$ $5p ^{2}P^{\circ}$ —10 $s ^{2}S$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 5/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array} $
5451,259 5434,039 5401,543 5264,368 5264,215	1 4 9 7 8	12,08 11,63 11,63 11,57 11,57	14,35 13,91 13,92 13,92 13,92	$5p ^{2}P^{\circ} - 9d ^{2}D$ $4f ^{2}F^{\circ} - 7d ^{2}D$ $4f ^{2}F^{\circ} - 7g ^{2}G$ $4d ^{2}D - 7f ^{2}F^{\circ}$ $4d ^{2}D - 7f ^{2}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5069 ,802 5068 ,937 4868 ,845 4851 ,082 4739 ,712	3 4 2 7 5	11,57 11,57 11,63 11,63 11,57	14,01 14,01 14,18 14,18 14,18	$4d\ ^{2}D-8p\ ^{2}P^{\circ}\ 4d\ ^{2}D-8p\ ^{2}P^{\circ}\ 4f\ ^{2}F^{\circ}-8d\ ^{2}D\ 4f\ ^{2}F^{\circ}-8g\ ^{2}G\ 4d\ ^{2}D-8f\ ^{2}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ. Α	I	$E_{_{ m II}},{ m eV}$	$E_{_{ m B}},{ m eV}$	Transition	J
4739,588 4631,405 4630,878 4534,291 4481,327	6 1 2 6 13	11,57 11,57 11,57 11,63 8,86	14,18 14,24 14,24 14,36 11,63	$4d^{2}D - 8f^{2}F^{\circ}$ $4d^{2}D - 9p^{2}P^{\circ}$ $4d^{2}D - 9p^{2}P^{\circ}$ $4f^{2}F^{\circ} - 9g^{2}G$ $3d^{2}D - 4f^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ - \\ 3/2 - 5/2 \end{array} $
4481,130 4436,598 4436,486 4433,990 4427,994	14 4 5 9 8	8,86 11,57 11,57 10,00 10,00	11,63 14,36 14,36 12,79 12,79	$3d^{2}D-4f^{2}F^{\circ}$ $4d^{2}D-9f^{2}F^{\circ}$ $4d^{2}D-9f^{2}F^{\circ}$ $4p^{2}P^{\circ}-6s^{2}S$ $4p^{2}P^{\circ}-6s^{2}S$	$ \begin{array}{c} 5/_2 7/_2 \\ 3/_2 - 5/_2 \\ 5/_2 - 7/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \end{array} $
4390,564 4384,637 4331,945 4242,543 4242,445	10 9 3 2 3	10,00 10,00 11,63 11,57 11,57	12,82 12,82 14,49 14,49 14,49	$4p \ ^{2}P^{\circ}-5d \ ^{2}D$ $4p \ ^{2}P^{\circ}-5d \ ^{2}D$ $4f \ ^{2}F^{\circ}-10g \ ^{2}G$ $4d \ ^{2}D-10f \ ^{2}F^{\circ}$ $4d \ ^{2}D-10f \ ^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ - \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4193,482 4109,54 4093,90 4013,80 3850,385	2 3 1 2 7	11,63 11,57 11,63 11,57 8,86	14,58 14,58 14,66 14,66 12,08	$4f ^2F^{\circ}$ —11 $g ^2G$ $4d ^2D$ —11 $f ^2F^{\circ}$ $4f ^2F^{\circ}$ —12 $g ^2G$ $4d ^2D$ —12 $f ^2F^{\circ}$ $3d ^2D$ —5 $p ^2P^{\circ}$	 3/ ₂ ¹ / ₂
3848,209 3615,583 3613,781 3553,366 3549,516	8 3 4 8 7	8,86 8,65 8,65 10,00 10,00	12,08 12,08 12,08 13,49 13,49	$3d^{2}D - 5p^{2}P^{\circ}$ $4s^{2}S - 5p^{2}P^{\circ}$ $4s^{2}S - 5p^{2}P^{\circ}$ $4p^{2}P^{\circ} - 7s^{2}S$ $4p^{2}P^{\circ} - 7s^{2}S$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
3538,813 3534,972 3175,783 3172,706 3168,951	8 7 7 6 6	10,00 10,00 10,00 10,00 10,00	13,50 13,50 13,90 13,90 13,91	$4p\ ^2P^{\circ}-6d\ ^2D$ $4p\ ^2P^{\circ}-6d\ ^2D$ $4p\ ^2P^{\circ}-8s\ ^2S$ $4p\ ^2P^{\circ}-8s\ ^2S$ $4p\ ^2P^{\circ}-7d\ ^2D$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
3165,878 3104,809 3104,722 2971,839 2969,145	2 8 9 1 0	10,00 8,86 8,86 10,00 10,00	13,91 12,86 12,86 14,17 14,17	$4p^{2}P^{\circ}-7d^{2}D$ $3d^{2}D-5f^{2}F^{\circ}$ $3d^{2}D-5f^{2}F^{\circ}$ $4p^{2}P^{\circ}-9s^{2}S$ $4p^{2}P^{\circ}-9s^{2}S$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
2968,020 2967,87 2965,19 2936,509 2928,634	2 1 0 10 9	10,00 10,00 10,00 4,43 4,42	14,18 14,18 14,18 8,65 8,65	4p ² P°-8d ² D 4p ² P°-8d ² D 4p ² P°-8d ² D 3p ² P°-4s ² S 3p ² P°-4s ² S	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$
2802,704 2797,998 2795,528 2790,776 2660,817	12 10 13 9 8	0,00 4,43 0,00 4,42 8,86	4,42 8,86 4,43 8,86 13,52	$3s^{2}S - 3p^{2}P^{\circ}$ $3p^{2}P^{\circ} - 3d^{2}D$ $3s^{2}S - 3p^{2}P^{\circ}$ $3p^{2}P^{\circ} - 3d^{2}D$ $3d^{2}D - 6f^{2}F^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
2660 ,755 2449 ,590 2329 ,578 1753 ,474 1750 ,664	8 6 3 60 50	8,86 8,86 8,86 4,43 4,42	13,52 13,92 14,18 11,50 11,50	$3d^{2}D-6f^{2}F^{\circ}$ $3d^{2}D-7f^{2}F^{\circ}$ $3d^{2}D-8f^{2}F^{\circ}$ $3p^{2}P^{\circ}-5s^{2}S$ $3p^{2}P^{\circ}-5s^{2}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1737,628 1737,612 1734,852 1482,890 1480,880	10 10 10 —	4,43 4,43 4,42 4,43 4,42	11,57 11,57 11,57 12,79 12,79	$3p \ ^{2}P^{\circ}-4d \ ^{2}D$ $3p \ ^{2}P^{\circ}-6s \ ^{2}S$ $3p \ ^{2}P^{\circ}-6s \ ^{2}S$	3/2 - 5/2 $3/2 - 3/2$ $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$
1478,004 1477,997 1476,000	_ _ _	4,43 4,43 4,42	12,82 12,82 12,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$

					
λ, λ	I	E_{H}^{\prime} , eV	E _E , eV	Transition	J
1369,423 1367,708	<u>-</u>	4,43 4,42	13,49 13,49	3p ² P°—7s ² S 3p ² P°—7s ² S	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
1367,256 1365,544 1309,443 1308,280 1307,875	- - - -	4,43 4,42 4,43 4,43 4,42	13,50 13,50 13,90 13,91 13,90	$3p ^{2}P^{\circ}-6d ^{2}D$ $3p ^{2}P^{\circ}-6d ^{2}D$ $3p ^{2}P^{\circ}-8s ^{2}S$ $3p ^{2}P^{\circ}-7d ^{2}D$ $3p ^{2}P^{\circ}-8s ^{2}S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1306,714 1273,423 1272,720 1271,940 1271,239	 	4,42 4,43 4,43 4,42 4,42	13,91 14,17 14,18 14,17 14,18	$3p \ ^{2}P^{\circ}-7d \ ^{2}D$ $3p \ ^{2}P^{\circ}-9s \ ^{2}S$ $3p \ ^{2}P^{\circ}-8d \ ^{2}D$ $3p \ ^{2}P^{\circ}-9s \ ^{2}S$ $3p \ ^{2}P^{\circ}-8d \ ^{2}D$	$^{1}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-1}/_{2}$ $^{3}/_{2}$ $^{-3}/_{2}$, $^{5}/_{2}$ $^{1}/_{2}$ $^{-1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$
1240,395 1239,925 1026,113 1025,968 946,769		0,00 0,00 0,00 0,00 0,00	10,00 10,00 12,08 12,08 13,09	3s ² S-4p ² P° 3s ² S-4p ² P° 3s ² S-5p ² P° 3s ² S-5p ² P° 3s ² S-6p ² P°	$^{1}/_{2}$ $^{-1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-1}/_{2}$
946,703 907,412 907,375 884,719 884,697		0,00 0,00 0,00 0,00 0,00	13,10 13,66 13,66 14,01 14,01	3s ² S-6p ² P° 3s ² S-7p ² P° 3s ² S-7p ² P° 3s ² S-8p ² P° 3s ² S-8p ² P°	$\begin{array}{c} {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{3}/_{2} \end{array}$

Mg III, ground state $1s^2$ $2s^2$ $2p^6$ 1S_0 Ionization potential 364 cm $^{-1}$; 80,134 eV

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λ, λ	I	$E_{_{ m H}},\;{ m eV}$	$E_{ m _B}$, eV	Transition	J
2529 ,97	2	53,05	57,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1
2468 ,50	3	52,92	57,95		1-1
2396 ,04	3	52,77	57,95		2-1
2318 ,83	1	53,50	58,85		1-2
2178 ,37	3	53,50	59,19		1-2
2134,72	3	53,50	59,31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
2113,45	2	53,50	59,37		1-2
2098,62	2	53,05	58,95		0-1
2092,64	4	52,92	58,85		1-2
2086,55	2	53,50	59,44		1-1
2065,54	5	52,77	58,77	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3
2056,13	3	52,92	58,95		1-1
2040,23	3	52,77	58,85		2-2
2005,55	0	52,77	58,95		2-1
1979,31	1	53,05	59,31		0-1
1977,56 1971,57 1962,18 1954,87 1941,50	1 0 0 0	52,92 59,44 59,44 59,42 { 52,92 59,44	59,19 65,73 65,76 65,76 59,31 65,83	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [4^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3s \ [4^{1}/_{2}]^{\circ} - 3p' \ [4^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d \ [4^{1}/_{2}]^{\circ} \end{array}$	1-2 1-0 1-1 0-1 1-1 1-2
1938,95	0	59,37	65,76	$\begin{array}{c} 3p' \ [1^{1}/_{2}] - 3d \ [^{1}/_{2}]^{c} \\ 3s' \ [^{1}/_{2}]^{o} - 3p' \ [^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d' \ [^{1}/_{2}]^{c} \\ 3s \ [1^{1}/_{2}]^{o} - 3p \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{o} - 3p' \ [1^{1}/_{2}] \end{array}$	2—1
1937,80	2	53,05	59,44		0—1
1933,59	0	60,06	66,47		0—1
1930,64	3	52,77	59,19		2—2
1923,87	3	52,92	59,37		1—2

		-			
λ, λ	I	$E_{ m H}^{},~{ m eV}$	$E_{\rm B}$, eV	Transition	.; j
1918,76	1	59,37	65,83	$3p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 3d \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} \\ 3s \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} - 3p \begin{bmatrix} 1/_{2} \end{bmatrix} \\ 3s \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} - 3p \begin{bmatrix} 1/_{2} \end{bmatrix} \\ 3s \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} - 3p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} \\ 3s' \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ} - 3p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}$	2-2
1908,46	3	52,92	59,42		1-0
1901,55	1	52,92	59,44		1-1
1896,26	0	52,77	59,31		2-1
1890,35	2	53,50	60,06		1-0
1887,31	0	59,19	65,76	$\begin{array}{c} 3p \ [1^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p \ [1^{1}/_{2}] - 3d \ [3^{1}/_{2}]^{\circ} \end{array}$	2-1
1879,46	4	52,77	59,37		2-2
1868,23	1	59,19	65,83		2-2
1858,19	2	52,77	59,44		2-1
1838,32	1	59,19	65,94		2-3
1820,47 1800,75 1794,68 1791,50 1788,05	1 4 3 1	59,42 59,19 59,44 59,31 59,37	66,23 66,08 66,35 66,23 66,30	$\begin{array}{c} 3p\{1/_{2}\} - 3d \{1^{1}/_{2}\}^{\circ} \\ 3p\{1^{1}/_{2}\} - 3d \{2^{1}/_{2}\}^{\circ} \\ 3p'\{1/_{2}\} - 3d'\{1^{1}/_{2}\}^{\circ} \\ 3p'\{1/_{2}\} - 3d'\{1^{1}/_{2}\}^{\circ} \\ 3p'\{1^{1}/_{2}\} - 3d'\{2^{1}/_{2}\}^{\circ} \\ 3p'\{1^{1}/_{2}\} - 3d'\{2^{1}/_{2}\}^{\circ} \end{array}$	0-1 2-3 1-2 1-1 2-2
1783,36	4	59,37	66,32	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3
1773,09	3	59,31	66,30		1-2
1763,93	2	59,44	66,47		1-1
1758,01	1	59,42	66,47		0-1
1749,02	5	58,85	65,94		2-3
1747,64	4	58,95	66,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2
1744,08	0	59,19	66,30		2-2
1739,56	0	59,19	66,32		2-3
1738,91	6	58,77	65,90		3-4
1731,88	1	59,19	66,35		2-2
1730,81 1722,10 1714,85 1703,78 1703,43	1 2 0 1 0	59,31 58,77 58,85 58,85 58,95 59,19	66,47 65,94 66,05 66,08 66,23 66,47	$\begin{array}{c} 3p'[1^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ} \\ 3p [2^{1}/_{2}] - 3d [3^{1}/_{2}]^{\circ} \\ 3p [2^{1}/_{2}] - 3d [2^{1}/_{2}]^{\circ} \\ 3p [2^{1}/_{2}] - 3d [2^{1}/_{2}]^{\circ} \\ 3p [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ} \\ 3p [1^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ} \end{array}$	1-1 3-3 2-2 2-3 1-1 2-1
1697,32	2	58,77	66,08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3
1679,56	0	58,85	66,23		2-1
1675,76	0	58,95	66,35		1-2
1659,28	0	58,85	66,32		2-3
1652,26	0	58,85	66,35		2-2
1648,88	0	58,95	66,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
1642,86	1	58,77	66,32		3-3
1592,39	1	57,95	65,73		1-0
1586,26	3	57,95	65,76		1-1
1572,72	4	57,95	65,83		1-2
234 ,258	12	0,00	52,92	$\begin{array}{c} 2p^{6} {}^{1}S - 3s [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3s' [1/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3d [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3d' [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 3d' [1^{1}/_{2}]^{\circ} \end{array}$	0-1
231 ,730	14	0,00	53,50		0-1
188 ,526	3	0,00	65,76		0-1
187 ,194	8	0,00	65,83		0-1
186 ,510	9	0,00	66,47		0-1
182,973	2	0,00	67,76	$\begin{array}{c} 2p^{6} {}^{1}S - 4s [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 4s' [1/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 4d [1/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 4d [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 4d' [1^{1}/_{2}]^{\circ} \end{array}$	0—1
182,240	3	0,00	68,03		0—1
171,896	0	0,00	72,42		0—1
171,395	4	0,00	72,33		0—1
170,802	5	0,00	72,59		0—1
169,746 169,150 165,195 164,954 164,384	1 1 0 2 2	00,00 00,00 00,00 00,00	73,04 73,29 75,05 75,16 75,42	$\begin{array}{c} 2p^{6} {}^{1}S - 5s [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 5s' [1/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 5d [1/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ} \\ 2p^{6} {}^{1}S - 5d' [1^{1}/_{2}]^{\circ} \end{array}$	0-1 0-1 0-1 0-1 0-1
164,159 163,586	0	0,00	75,52 75,79	$\frac{2p^{6} {}^{1}S - 6s [1^{1}/_{2}]^{\circ}}{2p^{6} {}^{1}S - 6s' [1/_{2}]^{\circ}}$	0—1 0—1

	λ, Å	I	$E_{ m H}^{},$ eV $^{ }$	$E_{ m B}^{-}$ eV	Transition	J	
-		'	<u> </u>				
	164,683	0	00,0	76,68	$2p^{6} {}^{1}S - 6d [1^{1}/2]^{\circ}$	0-1	
	161,135	0	0.00	76.94	$2p^{6} {}^{1}S - 6d' {1 {1 \choose 2}}^{\circ}$	0-1	
	159,755	0	00,00	77 ,60	$2p^{6} {}^{1}S - 7d \left[\frac{1}{4} \right]^{\circ}$	0-1	
	159,209	0	00,0	77,87	$2p^{6} {}^{1}S - 7d' \left[4^{1}/_{2} \right]^{c}$	0-1	
	158,530	0	00,00	7 8,20	$2p^{6-1}S$ —8 $d[1^{1}/_{2}]^{c}$	0—1	
	158,530	0	00,00	78,20		0—1	

Mg IV, ground state $1s^2 2s^2 2p^{5/2}P^{\circ}_{3/2}$ Ionization potential 881 759 cm⁻¹; 109,318 eV

i A		E aV	v eV	Transition	
/	· !	E _{II} . eV	E _B , eV		
1956,58 1946,20 1925,99 1906,71 1893,87	0 0 0 0 4	67,69 67,59 67,59 67,59 67,41	74,02 73,96 74,02 74,09 73,96	3s 4P-3p 4P 3s 4P-3p 4P 3s 4P-3p 4P 3s 4P-3p 4P 3s 4P-3p 4P	$^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{5}/_{2}$ $^{5}/_{2}$
1874,59 1698,83 1683,04 1680,02 1658,92	0 2 3 0 0	67,41 67,59 67,41 67,59 67,41	74,02 74,88 74,78 74,96 74,88	$3s ^4P - 3p ^4P^c$ $3s ^4P - 3p ^4D^c$ $3s ^4P - 3p ^4D^c$ $3s ^4P - 3p ^4D^c$ $3s ^4P - 3p ^4D^c$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
1508,82 1490,41 1459,52 323,310 320,999	0 0 1 18 20	67,69 67,59 67,41 0,28 0,00	75,90 75,90 75,90 38,62 38,62	$3s^{4}P - 3p^{4}S^{\circ}$ $3s^{4}P - 3p^{4}S^{\circ}$ $3s^{4}P - 3p^{4}S^{\circ}$ $2p^{5}{}^{2}P^{\circ} - 2p^{6}{}^{2}S$ $2p^{5}{}^{2}P^{\circ} - 2p^{6}{}^{2}S$	$ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{1}{2} $
184,189 183,915 183,439 181,345 180,796	0 1 4 8 9	0,28 0,00 0,00 0,28 0,28	67,59 67,44 67,59 68,64 68,85	$\begin{array}{c} 2p^{5} \ ^{2}P^{\circ} - 3s \ ^{4}P \\ 2p^{5} \ ^{2}P^{\circ} - 3s \ ^{4}P \\ 2p^{5} \ ^{2}P^{\circ} - 3s \ ^{4}P \\ 2p^{5} \ ^{2}P^{\circ} - 3s \ ^{2}P \\ 2p^{5} \ ^{2}P^{\circ} - 3s \ ^{2}P \end{array}$	$\frac{1}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{1}{2}$
180,617 180,070 172,306 171,653 160,804	10 8 7 8 4	0,00 0,00 0,28 0,00 0,28	68,64 68,85 72,23 72,23 77,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2, 5/2 \\ 1/2 - 1/2 \end{array}$
160,230 148,121 147,887 147,746	ьі 2 1 4	0,00 0,28 - 0,00	77,37 84,03 — 83,91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} \frac{3/2 - 1/2}{1/2 - 3/2} \\ -\frac{3/2 - 5/2}{3/2 - 3/2} \end{array}$
147,632 147,535 147,405 147,321 147,252	0 5 5 4 3 4	0,00 0,28 0,00 0,28	84,03 84,31 84,11 84,43 — 84,31	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ - \\ 3/2 - 3/2 \end{array} $
147,052 147,006 146,949 146,836 146,526 140,966	4 4 4 3 4 4	0,00 0,28 0,00 0,00 0,28	84,61 84,43 84,61 88,22	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} \frac{1}{2} - \frac{3}{2} \\ \frac{1}{2} - \frac{3}{2} \\ - \\ \frac{3}{2} - \frac{1}{2} \\ \frac{3}{2} - \frac{3}{2} \\ \frac{1}{2} - \frac{1}{2} \end{array} $
140,918 140,867 140,564	$\frac{2}{4}$	$\begin{array}{c} 0,28 \\ 0,28 \\ 0,28 \end{array}$	88,26 88,29 88,56	$2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$	$\frac{1}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{1}{2}$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
140,523 140,475	2 2	0,00 0,00	88,22 88,26	$2p^{5} {}^{2}P^{\circ} - 3a' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3a' {}^{2}P$	$^{3}/_{2}$ — $^{1}/_{2}$ $^{3}/_{2}$ — $^{3}/_{2}$
140,425 140,176 140,120 139,995 138,693	2 4 4 1 1	0,00 0,00 0,00 - 0,28	88,29 88,44 88,56 — 89,67	$2p^{5} {}^{2}P^{\circ} - 3a' {}^{'2}D$ $2p^{5} {}^{2}P^{\circ} - 3a' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3a' {}^{2}S$ $ 2p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ - \\ 1/2 - 3/2 \end{array} $
138,394 138,262 137,966 133,202 132,815	2 3 1 3 3	$0,28 \\ 0,00 \\ 0,00 \\ 0,28 \\ 0,00$	89,86 89,67 89,86 93,35	$2p^{5} ^{2}P^{\circ}$ — $4s ^{2}P$ $2p^{5} ^{2}P^{\circ}$ — $4s ^{2}P$ $2p^{5} ^{2}P^{\circ}$ — $4s ^{2}P$ $2p^{5} ^{2}P^{\circ}$ — $3d'' ^{2}D$ $2p^{5} ^{2}P^{\circ}$ — $3d'' ^{2}D$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2}, \end{array}$
130,630 130,350 130,294 130,243 130,118	1 3 2 1 2	$\begin{array}{c} 0,28 \\ 0,28 \\ 0,00 \\ 0,28 \\ 0,28 \end{array}$	95,49 95,39 94,77 95,47	$2p^{5} {}^{2}P^{\circ}-4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ}-4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}-4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}-4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}-4d {}^{2}D$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array}$
130,085 129,969 129,855 129,710 125,811	2 3 4 2 1	0,00 0,00 0,00 0,00 0,28	95,30 95,39 95,47 95,56 98,82	$2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4s'' {}^{2}S$	3/2 - 5/2 $3/2 - 1/2$ $3/2 - 3/2$ $3/2 - 3/2$ $1/2 - 1/2$
125,459 124,990 124,870 124,759 124,649	0 2 2 2 3	0,00 0,28 0,28 0,28 0,00	98,82 99,46 99,56 99,65 99,46	$2p^{5} {}^{2}P^{\circ} - 4s'' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 4a' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4a' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2, & 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2, & 3/2 \end{array}$
124,538 124,414 123,722 123,588 123,500	2 2 0 0 3	0,00 0,00 0,28 0,28 0,00	99,56 99,65 100,49 100,59 100,38	$2p^{5} {}^{2}P^{\circ}$ — $4a' {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4a' {}^{2}S$ $2p^{5} {}^{2}P^{\circ}$ — $5d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $5d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $5d {}^{2}D$	$\begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2, & 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
123,377 123,273 120,283 118,603	1 2 1 1	0,00 0,00 —	100,49 100,59 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

Mg V, ground state $1s^22s^22p^{4/3}P_2$ Ionization potential $1\,139\,421$ cm $^{-1}$; 141,262 eV

λ, Λ	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
355,326 354,223 353,300	12 10 9	$0,22 \\ 0,31 \\ 0,22$	35,12 35,31 35,31	$2p^4$ 3P — $2p^5$ $^3P^\circ$ $2p^4$ 3P — $2p^5$ $^3P^\circ$ $2p^4$ 3P — $2p^5$ $^3P^\circ$	1-2 0-1 1-1
353,094 352,202 351,089	14 10 12	$0,00 \\ 0,22 \\ 0,00$	35,42 35,42 35,31	$2p^{4} {}^{3}P - 2p^{5} {}^{3}P^{\circ} \ 2p^{4} {}^{3}P - 2p^{5} {}^{3}P^{\circ} \ 2p^{4} {}^{3}P - 2p^{5} {}^{3}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 1-0 \\ 2-1 \end{array} $
312,311 312,581 276,581 152,591	10 16 0	9,63 4,51 35,42	49,33 49,33 49,33 116,67	$2p^{5} {}^{3}P = 2p^{5} {}^{3}P^{\circ}$ $2p^{4} {}^{1}S = 2p^{5} {}^{1}P^{\circ}$ $2p^{4} {}^{1}D = 2p^{5} {}^{1}P^{\circ}$ $2p^{5} {}^{3}P^{\circ} = 3s''' {}^{3}P$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 2-1 \\ 0-1 \end{array} $
152,591 152,527 152,384	1 1	35,31 35,31	116,57 116,59 116,67	$2p^{5} {}^{3}P {}^{\circ} - 3s''' {}^{3}P$ $2p^{5} {}^{3}P {}^{\circ} - 3s''' {}^{3}P$	1—1 1—2 1—1
152,149 152,019	$\frac{3}{0}$	35,12 $35,12$	116,59 116,67	$2p^{5} {}^{3}P^{\circ} - 3s''' {}^{3}P$ $2p^{5} {}^{3}P^{\circ} - 3s''' {}^{3}P$	$\begin{array}{c} 2 - 2 \\ 2 - 1 \end{array}$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	.1
146,621 146,464	4 5	0,31 0,22	84 ,87 84 ,87	2p ⁴ ³ P — 3s ³ S° 2p ⁴ ³ P — 3s ³ S°	0—1 1—1
146,083 145,485 142,933 137,880	6 5 6 6	0,00 9,63 4,51 0,31	84,87 94,85 91,24 90,23	$2p^4 {}^3P - 3s {}^3S^{\circ}$ $2p^4 {}^1S - 3s'' {}^1P^{\circ}$ $2p^4 {}^1D - 3s' {}^1D^{\circ}$ $2p^4 {}^3P - 3s' {}^3D^{\circ}$	$ \begin{array}{r} 2-1 \\ 0-1 \\ 2-2 \\ 0-1 \end{array} $
137,748		0,22	90,23 $90,22$	$\frac{5}{2}p^4 \ ^3P - 3s' \ ^3D^{\circ}$ $2p^4 \ ^3P - 3s' \ ^3D^{\circ}$	$\begin{array}{c} 1 - 2 \\ 2 - 3 \end{array}$
137 ,414 137 ,234	6	$0,00 \\ 4,51$	94,85	$2p^{4} \cdot P - 3s \cdot D$ $2p^{4} \cdot 1D - 3s'' \cdot 1P^{\circ}$ $2p^{5} \cdot 3P^{\circ} - 3s^{IV} \cdot 3D$	2—3 2—1 0—1
136,128 135,953 135,638	0 1 2	35,42 35,31 35,12	126,50 126,50 126,50	$2p^{5-3}P^{\circ} - 3s^{\text{IV}} ^{3}D$ $2p^{5-3}P^{\circ} - 3s^{\text{IV}} ^{3}D$	$ \begin{array}{c} 1 \\ 1 \\ 2 \\ 2 \\ 3 \end{array} $
132,623	3	0,31	93,79	$2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$	0—1
132,485 132,171 126,677	5 6 0	$^{0,22}_{0,00}$ 35,42	93,80 93,80 133,29	$2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^4 \ ^3P - 3s'' \ ^3P^\circ \ 2p^5 \ ^3P^\circ - 3d''' \ ^3D$	1—1, 2 2—2 0—1
126,544	2	35,31	133,29	$2p^{5} {}^{3}P^{\circ} - 3d''' {}^{3}D$	1—1, 2
126 ,280 125 ,600 122 ,034	4 4 4	35,12 9,63 0,31	133,29 108,34 101,90	$2p^{5} {}^{3}P^{\circ} - 3d''' {}^{3}D \ 2p^{4} {}^{1}S - 3d' {}^{1}P^{\circ} \ 2p^{4} {}^{3}P - 3d {}^{3}D^{\circ}$	2—1, 2, 3 0—1 0—1
122,034 121,922 121,644	5 6	$0,22 \\ 0,00$	101,90 101,91 101,92	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 2—3
1 19 ,447 119 ,401	4		108,34	$2p^{4} ^{1}D - 3d' ^{1}P^{\circ}$	
118,810 118,083 115,537	5 5 4	4,51 4,51 4,51	108,86 109,50 111,81	$2p^{4} ^{1}D - 3d' ^{1}D^{\circ}$ $2p^{4} ^{1}D - 3d' ^{1}F^{\circ}$ $2p^{4} ^{1}D - 3d'' ^{1}D^{\circ}$	$\begin{array}{c} 2-2 \\ 2-3 \\ 2-2 \end{array}$
115,399 115,093	4 4	4,51 4,51	111,94 112,23	$2p^{4} {}^{1}D - 3d'' {}^{1}P^{\circ} \ 2p^{4} {}^{1}D - 3d'' {}^{1}F^{\circ}$	2—1 2—3
115,013 114,785	$\frac{6}{6}$	$\substack{0,22\\0,00}$	108,01 108,01	$\frac{2p^4}{2p^4}\frac{3P}{3P} - \frac{3a'}{3D}$ ° $\frac{3D}{2p^4}\frac{3P}{3P} - \frac{3a'}{3D}$ °	1—1, 2 2—1, 2, 3
114,324 114,285	$\frac{3}{3}$	$0,31 \\ 0,22$	108,76 108,70	$2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 3d' ^{3}P^{\circ}$	0-1 $1-2$
114,226 114,199	3 3 4	$0,22 \\ 0,22 \\ 0,00$	108,76 108,78	$2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ} \ 2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ} \ 2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ}$	$egin{array}{c} 1 - 1 \ 1 - 0 \ 2 - 2 \end{array}$
114,059 114,029	4 2	0,00 0,31	108,70 109,04	$2p^4 ^3P - 3d' ^3S^{\circ}$	0—1
113,990 113,934	3 3 1	$^{0,00}_{0,22}_{35,12}$	108,76 109,04 144,03	$2p^{4} ^{3}P - ^{3}d' ^{3}P^{\circ} \ 2p^{4} ^{3}P - ^{3}d' ^{3}S^{\circ} \ 2p^{5} ^{3}P^{\circ} - ^{4}s''' ^{3}P$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 2-2 \end{array} $
113,823 113,703 113,518	4	0,00 $35,42$	109,04 144,64	$2p^{4} {}^{3}P - 3d' {}^{3}S^{\circ} \ 2p^{5} {}^{3}P^{\circ} - 3d^{\mathrm{IV}} {}^{3}D$	$ \begin{array}{c} \overline{2} - \overline{1} \\ 0 - 1 \end{array} $
113,318	2	35,31	144,63	$2p^{5} {}^{3}P^{\circ} - 3d^{\mathrm{IV}} {}^{3}D$	1-2
113,217 111,496	$\frac{2}{2}$	$\begin{array}{c} 35,12 \\ 0,22 \\ \end{array}$	144,62 111,41	$2p^{5} {}^{3}P^{\circ} - 3d^{1}V {}^{3}D \ 2p^{4} {}^{3}P - 3d'' {}^{3}P^{\circ} \ 2p^{4} {}^{3}P - 3d'' {}^{3}P^{\circ}$	$ \begin{array}{c} 2-3 \\ 1-0 \\ 1-1 \end{array} $
111,467 111,419	2	$\substack{0,22\\0,22}$	111 ,44 111 ,49	$2\hat{p}^{4} {}^{3}P - 3d'' {}^{3}P^{\circ}$	1—2
111,247 111,199	2 4	0,00 0,00	111,44 111,49	$2p^4 \ ^3P - 3d'' \ ^3P^{\circ} \ 2p^4 \ ^3P - 3d'' \ ^3P^{\circ} \ 2p^4 \ ^3P - 3d'' \ ^3D^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 0-1 \end{array} $
111,091 111,031 110,939	$\begin{array}{c} 3 \\ 3 \\ 2 \end{array}$	$\substack{0,31 \\ 0,22 \\ 0,22}$	111,91 111,88 111,44	$2p^{4} ^{3}P - 3d ^{\prime\prime} ^{3}D^{\circ}$ $2p^{4} ^{3}P - 3d ^{\prime\prime} ^{3}P^{\circ}$	1—2 1—1
110,859 110,809	4 2	00,00 00,00	111,83 111,88	$2p^4 {}^3P - 3d'' {}^3D^{\circ} \ 2p^4 {}^3P - 3d'' {}^3D^{\circ}$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$
110,809 110,121 110,029	0 1	$^{0,31}_{0,22}$	112,89 112,89	$2p^{4} {}^{3}P - 4s {}^{3}S^{\circ} 2p^{4} {}^{3}P - 4s {}^{3}S^{\circ}$	0—1 1—1
109,812	2	00,00	112,89	$2p^{4} ^{3}P - 4s ^{3}S^{\circ}$	2—1

λ, Λ	I,	E _H , eV	E _B , eV	Transition	J
109,174	0	9,63	123 ,21	$2p^{4} {}^{1}S - 4s'' {}^{1}P^{\circ}$ $2p^{4} {}^{1}D - 4s' {}^{1}D^{\circ}$ $2p^{4} {}^{1}D - 4s'' {}^{1}P^{\circ}$ $2p^{4} {}^{3}P - 4s' {}^{3}D^{\circ}$ $2p^{4} {}^{3}P - 4d {}^{3}D^{\circ}$	0-1
107,661	2	4,51	119 ,66		2-2
104,432	2	4,51	123 ,21		2-1
104,214	1	0,31	119 ,27		0-1
104,182	1	0,31	119 ,31		0-1
104,140	2	0,22	119,27	$2p^4 \ ^3P - 4s' \ ^3D^\circ \ 2p^4 \ ^3P - 4d \ ^3D^\circ \ 2p^4 \ ^3P - 4d \ ^3D^\circ \ 2p^4 \ ^3P - 4d \ ^3D^\circ \ 2p^5 \ ^3P^\circ - 5s''' \ ^3P$	1—1, 2
104,100	2	0,22	119,32		1—2
103,947	3	0,00	119,27		2—1, 2, 3
103,904	4	0,00	119,32		2—3
103,333	0	35,12	155,10		2—2
102,079 101,782 101,671 100,949 99,788	$\frac{2}{3}$ $\frac{3}{0}$ $\frac{1}{1}$	4,51 4,51 4,51 0,00 0,00	125,96 126,31 126,45 122,81 124,24	$2p^{4} ^{1}D - 4d' ^{1}P^{\circ}$ $2p^{4} ^{1}D - 4d' ^{1}D^{\circ}$ $2p^{4} ^{1}D - 4d' ^{1}F^{\circ}$ $2p^{4} ^{3}P - 4s'' ^{3}P^{\circ}$ $2p^{4} ^{3}P - 5s ^{3}S^{\circ}$	2—1 2—2 2—3 2—1, 2 2—1
99,067 99,025 98,983 98,872 98,805	$egin{array}{c} 2 \\ 2 \\ 1 \\ 1 \\ 2 \end{array}$	4,51 4,51 4,51 0,31 0,22	129,65 129,71 129,76 125,70 125,70	$2p^{4} ^{1}D - 4d'' ^{1}D^{\circ}$ $2p^{4} ^{1}D - 4d'' ^{1}P^{\circ}$ $2p^{4} ^{1}D - 4d'' ^{1}F^{\circ}$ $2p^{4} ^{3}P - 4d' ^{3}D^{\circ}$ $2p^{4} ^{3}P - 4d' ^{3}D^{\circ}$	2-2 2-1 2-3 0-1 1-1, 2
98,636	2	0,00	125,70	$2p^4 \ ^3P - 4d' \ ^3D^\circ \ 2p^4 \ ^3P - 4d' \ ^3P^\circ \ $	2-1, 2, 3
98,444	1	0,22	126,16		1-2
98,406	1	0,22	126,20		1-0, 1
98,271	2	0,00	126,16		2-2
98,235	1	0,00	126,20		2-1
97,686	1	0,31	127,24	$2p^4 \ ^3P - 3p''' \ ^3D^{\circ} \ 2p^4 \ ^3P - 3p''' \ ^3D^{\circ} \ 2p^4 \ ^3P - 5d \ ^3D^{\circ} \ 2p^4 \ ^3P - 3p''' \ ^3D^{\circ} \ 2p^4 \ ^3P - 5d \ ^3D^{\circ}$	0-1
97,606	2	0,22	127,24		1-1, 2
97,563	1	0,22	127,30		1-1, 2
97,439	2	0,00	127,24		2-1, 2, 3
97,391	1	0,00	127,30		2-1, 2, 3
96,159	0	0,31	129,24	$2p^4 \ ^3P - 4d'' \ ^3P^\circ \ 2p^4 \ ^3P - 4d'' \ ^3P^\circ \ 2p^4 \ ^3P - 4d'' \ ^3D^\circ \ 2p^4 \ ^3P - 4d'' \ ^3P^\circ \ 2p^4 \ ^3P - 4d'' \ ^3P^\circ \ $	0-1
96,085	1	0,22	129,24		1-1
96,019	2	0,31	129,41		0-1
95,965	1	0,22	129,41		1-1, 2, 3
95,909	1	0,00	129,27		2-2
95,803 95,592 95,556 94,793 93,109	2 0 1 0	0,00 4,51 4,51 0,00 4,51	129,41 134,20 134,25 130,79 137,66	$\begin{array}{c} 2p^{4} ^{3}P - 4d'' ^{3}D^{\circ} \\ 2p^{4} ^{1}D - 5d' ^{1}D^{\circ} \\ 2p^{4} ^{1}D - 5d' ^{1}F^{\circ} \\ 2p^{4} ^{3}P - 5s' ^{3}D^{\circ} \\ 2p^{4} ^{1}D - 5d'' ^{1}D^{\circ} \end{array}$	$\begin{array}{c} 2-1, \ 2, \ 3 \\ 2-2 \\ 2-3 \\ 2-1, \ 2, \ 3 \\ 2-2 \end{array}$
92,641	0	0,00	133,82	$2p^4$ 3P — $5d'$ $^3D^\circ$	2-1, 2, 3
92,588	0	0,22	134,13	$2p^4$ 3P — $5d'$ $^3P^\circ$	1-2
92,428	0	0,00	134,13	$2p^4$ 3P — $5d'$ $^3P^\circ$	2-2
92,409	0	0,00	134,16	$2p^4$ 3P — $5d'$ $^3P^\circ$	2-1

Mg VI, ground state $1s^2 \ 2s^2 2p^3 \ ^4S^9_{3/2}$ Ionization potential $1\ 507\ 520\ {\rm cm^{-1}};\ 186,898\ {\rm eV}$

$\lambda, \tilde{\Lambda}_0$	I	$E_{\mathrm{II}},\;eV$	EB, eV	Transition	J
315, 403	8	00,00	30,74	$2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$	$^{3}/_{2}$ — $^{5}/_{2}$
400,676	7	0,00	30,94	$2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$	3/2 $3/2$
399,289	6	0,00	31,05	$2p^{3} {}^{4}S^{\circ} - 2p^{4} {}^{4}P$	$\frac{3}{2} - \frac{1}{2}$
388,020	3	10,27	42,22	$2p^{3} 2P^{\circ} - 2p^{4} 2D$	3/2 - 5/2
387,787	2	10,25	42,22	$2p^3 2P^{\circ} - 2p^4 2D$	$1/\frac{3}{2}$ $3/\frac{3}{2}$

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	λ, Å ₀	I	E_{H}^{\prime} , eV	$E_{\rm B}$, eV	Transition	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$,				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	349 ,155 314 ,676			42,22 49,67	$2p^3 2P^{\circ} - 2p^4 2S$	$^{3}/_{2}$ — $^{1}/_{2}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	554, 314	3	10,25	49,67	$2p^{3} 2P^{\circ} - 2p^{4} 2S$	$^{1}/_{2}$ $^{-1}/_{2}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	293,124 293,026		10,27 $10,25$	52,56 $52,56$	$2p^{3} 2P - 2p^{3} 2P$ $2p^{3} 2P^{\circ} - 2p^{4} 2P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	291,458	2	10,27	52,80	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	291 ,348 288 ,652	$\frac{3}{0}$	$10,25 \\ 6,72$	52,80 49,67	$2p^{3} {}^{2}P^{\circ} - 2p^{4} {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 2p^{4} {}^{2}S$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	270,394	12	6,71	52,56	$2p^3 ^2D^{\circ} - 2p^4 ^2P$	$^{5}/_{2}$ $-^{3}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{3/2}D^{\circ}-2p^{4/2}P$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{4} {}^{2}P - 3s^{V} {}^{2}P^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{4} {}^{2}P - 3s^{V} {}^{2}P^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	130,294				$2p^{4} {}^{2}P - 3s^{V} {}^{2}P^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		1				· -
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	126,450 125,600	1 4	49,67 $31,05$	147,71 129.76	$2p^4 \ ^2S - 3s^{\vee} \ ^2P^{\circ}$ $2p^4 \ ^4P - 3s^{'''} \ ^4S^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	125,459	3	30,94	129,76	$2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$	$^{3}/_{2}$ $^{-3}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{4} {}^{4}P - 3s''' {}^{4}S^{\circ}$ $2p^{4} {}^{2}D - 3s^{IV} {}^{2}D^{\circ}$	⁵ / ₂ — ³ / ₂
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						$\frac{1}{2}$, $\frac{3}{2}$, $\frac{1}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	121,025		10,27	112,71	$2p^3 2P^{\circ} - 3s^2P$	$\frac{1}{2}$, $\frac{3}{2}$ $\frac{3}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	117,527 447,226	1 3	$42,22 \\ 6,72$	147,71 112.47	$2p^{4} {}^{2}D - 3s^{V} {}^{2}P^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 3s {}^{2}P$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			6,71	71, 112	$2p^{3} 2D^{\circ} - 3s^{2}P$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						1/1/_ 3/
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{4} {}^{4}P - 3s^{IV} {}^{4}D^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	412, 412	0	30,74	139,11	$2p^{4} {}^{4}P - 3s^{IV} {}^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$, $\frac{5}{2}$, $\frac{7}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	113,189 111,864	5 4	$\frac{6,72}{0.00}$		$2p^{3} {}^{2}D^{\circ} - 3s^{\circ} {}^{2}D$ $2p^{3} {}^{4}S^{\circ} - 3s {}^{4}P$	$\frac{-}{^{3/2}-^{1/2}}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		4	0,00	110,95	$2p^{3} {}^{4}S^{\circ} - 3s {}^{4}P$	3/2-3/2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	111,552		0,00 10.27	111, 14 121,77	$2p^3 {}^4S^{\circ} - 3s {}^4P$ $2p^3 {}^2P^{\circ} - 3s'' {}^2S$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	111,133			121,77	$2p^{3} {}^{2}P^{\circ} - 3s'' {}^{2}S$	1/2-1/ ₂
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	108,441	0				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$2p^{4} ^{4}P - 3s^{4} ^{4}P^{\circ}$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		2	31,05	145,72	$2p^{4} {}^{4}P - 3d''' {}^{4}D^{\circ}$	¹ / ₂ — ³ / ₂
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				145,72 145.72	$2p^{4} ^{4}P - 3d''' ^{4}D^{\circ} \ 2p^{4} ^{4}P - 3d''' ^{4}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	·				•	· –
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		2	42,22	159,84	$2p^{4} {}^{2}D - 3d^{\text{IV}} {}^{2}F^{\circ}$	$\frac{3}{2}$ $-\frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	104,597	5	10,27	128,79 128,87	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$	$\frac{1}{2}$, $\frac{3}{2}$ $\frac{-3}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	104,319 $102,239$	5		131,52	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$	1/2, $1/2$ $3/2$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	102,189	5		131,59	$2p^{3} {}^{2}P^{\circ} - 3d {}^{2}D$	$\frac{3}{2} - \frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		პ 2		128,87	$2p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	3/2-1/2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	100,904	4	6,72	1 2 9,58		$^{3}/_{2}$ — $^{5}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				134,56	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	99,713	3	10,27	134,60	$2p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	$^{3}/_{2}$ _ $^{-}$ _{ $^{5}/_{2}}$
99,025 2 10,27 135,45 $2p^3 {}^{2}P^{6} - 3d' {}^{2}P$ $\frac{1}{2}, {}^{3}/_{2} - \frac{1}{2}$		4	6,71	131,59	$2p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$	⁵ / ₂ — ⁵ / ₂
· · · · · · · · · · · · · · · · · · ·		2	10,27	135,45	$2p^{3/2}P^{\circ}-3d'^{-2}P$	· -
						25

λ, Å ₀	I	E _H , eV	E _B , eV	Transition	J
98,983 98,508 97,278 97,251 96,973	4 3 5 5 4	10,27 10,27 6,71 6,72 6,72	135,51 136,12 134,16 134,20 134,56	$2p^3 \ ^2P^{\circ} - 3d' \ ^2P$ $2p^3 \ ^2P^{\circ} - 3d' \ ^2S$ $2p^3 \ ^2D^{\circ} - 3d' \ ^2F$ $2p^3 \ ^2D^{\circ} - 3d' \ ^2F$ $2p^3 \ ^2D^{\circ} - 3d' \ ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
96,939 96,903 96,857 96,797 96,704	4 0 1 1 2	6,71 31,05 30,94 30,94 30,74	134,60 158,99 158,94 159,02 158,94	$2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$ $2p^{4} {}^{4}P - 3d^{1}V {}^{4}P^{\circ}$ $2p^{4} {}^{4}P - 3s^{1}V {}^{4}P^{\circ}$ $2p^{4} {}^{4}P - 3d^{1}V {}^{4}P^{\circ}$ $2p^{4} {}^{4}P - 3d^{1}V {}^{4}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
96,670 96,467 96,388 96,303 96,256	2 0 1 2 2	30,74 31,05 30,94 6,72 6,71	158,99 159,56 159,56 135,45 135,51	$2p^{4} {}^{4}P - 3d^{\text{IV}} {}^{4}P^{\circ}$ $2p^{4} {}^{4}P - 3d^{\text{IV}} {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 3d^{\text{IV}} {}^{4}D^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$ $2p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
96,240 96,459 96,085 95,803 95,675	1 1 1 2 3	30,74 30,74 10,27 6,72 0,00	159,56 159,67 139,31 136,12 129,58	$2p^4 ^4P - 3d^{\mathrm{IV}} ^4D^{\circ}$ $2p^4 ^4P - 3d^{\mathrm{IV}} ^4S^{\circ}$ $2p^3 ^2P^{\circ} - 3d'' ^2D$ $2p^3 ^2D^{\circ} - 3d' ^2S$ $2p^3 ^4S^{\circ} - 3d ^4D$	$\begin{array}{c} {}^{5/}_{2} - {}^{3/}_{2}, \; {}^{5/}_{2}, \; {}^{7/}_{2} \\ {}^{5/}_{2} - {}^{3/}_{2} \\ - \\ {}^{3/}_{2} - {}^{1/}_{2} \\ {}^{3/}_{2} - {}^{3/}_{2}, \; \; {}^{5/}_{2} \end{array}$
95,637 95,483 95,421 95,385 93,493	3 5 4 4 3	0,00 0,00 0,00 0,00 6,72	129,63 129,84 129,93 129,98 139,31	$2p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 3d {}^{u}^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ - \end{array} $
93,109 92,964 90,897 89,649 89,021	1 6 0 0	30,94 30,74 0,00 10,27 31,05	164,10 164,10 136,39 148,56 170,31	$2p^{4} {}^{4}P - 4s''' {}^{4}S^{\circ}$ $2p^{4} {}^{4}P - 4s''' {}^{4}S^{\circ}$ $2p^{3} {}^{4}S^{\circ} - 3p''' {}^{4}P$ $2p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{4} {}^{4}P - 4d''' {}^{4}D^{\circ}$	3/2 - 3/2 $5/2 - 3/2$ $3/2 - 1/2$, $3/2$, $5/2$ $3/2 - 3/2$ $1/2 - 3/2$
88,952 88,827 87,406 86,807 85,622	2 2 0 2 3	30,94 $30,74$ $6,71$ $10,27$ $6,71$	170,31 170,31 148,56 153,05 151,51	$2p^{4} {}^{4}P - 4d''' {}^{4}D^{\circ}$ $2p^{4} {}^{4}P - 4d''' {}^{4}D^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$ $2p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 3p^{1} {}^{1}{}^{1}{}^{2}F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
85,577 85,153 84,745 83,560 83,519	2 0 2 2 3	6,72 10,27 6,72 0,00 6,72	151,59 155,86 153,05 148,37 155,16	$2p^{3} {}^{2}D^{\circ} - 3p^{1} {}^{1}V {}^{2}F$ $2p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 4s' {}^{2}D$ $2p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 4d {}^{2}F$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ - \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
83,403 82,853 82,475 82,238 81,106	4 1 1 2 3	6,71 10,27 10,27 30,74 6,72	155,36 159,90 160,59 181,49 159,57	$2p^{3} {}^{2}D^{\circ} - 4d {}^{2}F$ $2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}D$ $2p^{3} {}^{2}P^{\circ} - 4d' {}^{2}S$ $2p^{4} {}^{4}P - 5d''' {}^{4}D^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
80,930 80,724 80,075 80,032 79,857	2 0 2 2 4	6,72 6,72 0,00 0,00 0,00	159,90 160,29 154,83 154,91 155,25	$2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 4d' {}^{2}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	$\begin{array}{c} - \\ - \\ 3/2 - 3/2, 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
79,830 79,817 78,239 77,511 77,405	4 2 0 1 2	0,00 0,00 6,72 6,72 6,71	155,30 155,33 165,17 166,66 166,88	$2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $2p^{3} {}^{2}D^{\circ} - 4d {}'' {}^{2}D$ $2p^{3} {}^{2}D^{\circ} - 5d {}^{2}F$ $2p^{3} {}^{2}D^{\circ} - 5d {}^{2}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ - \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $

λ, Å ₀	I	E _H , eV	E_{B} , eV	Transition	J
76,908 75,890 75,834 75,334 75,248	0 0 2 1 1	10,27 0,00 0,00 6,72 6,72	171,47 163,36 163,48 171,28 171,47	$2p^3 \ ^2P^{\circ}$ $-5d' \ ^2D$ $2p^3 \ ^4S^{\circ}$ $-5s \ ^4P$ $2p^3 \ ^4S^{\circ}$ $-5s \ ^4P$ $2p^3 \ ^2D^{\circ}$ $-5d' \ ^2F$ $2p^3 \ ^2D^{\circ}$ $-5d' \ ^2D$	3/ ₂ —3/ ₂ 3/ ₂ —5/ ₂ 5/ ₂ —5/ ₂ ————————————————————————————————————
74,574 74,461 74,319 72,430	$\begin{array}{c} 2 \\ 0 \\ 3 \\ 1 \end{array}$	0,00 0,00 0,00 0,00	166,25 166,50 166,82 171,17	$2p^{3} {}^{4}S^{\circ} - 4p''' {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}D$ $2p^{3} {}^{4}S^{\circ} - 5d {}^{4}P$ $2p^{3} {}^{4}S^{\circ} - 6s {}^{4}P$	3/2 - 1/2, 3/2, 5/2 $3/2 - 3/2, 5/2$ $3/2 - 5/2$ $3/2 - 5/2$

Unclassified Lines of Magnesium

λ, Å	I	Expected assignment	λ, Å	I	Expected assignment
106,453	2	_	93,650	2	_
105,066	5	_	016, 88	2	
102,906	3		86,440	2	
100,597	$ar{2}$	_	86,417	2	_
100,545	$ar{f 2}$	_	7 9,880	2	_
99,610	$ar{f 2}$		75,666	3	

Al I, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^{\ 2}P_{1/2}^0$ Ionization potential $48\ 279,16\ \text{cm}^{-1};\ 5,985\ \text{eV}$

Tonization	poten	tiai 40.	279,10 CI	n -; 5,965 ev	
λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
21163,75 21093,04 19727,33 17699,09 16763,36	13 12 18 13	4,09 4,09 4,99 4,67 4,09	4,67 4,67 5,62 5,37 4,83	$4p \ ^{2}P^{\circ}$ — $5s \ ^{2}S$ $4p \ ^{2}P^{\circ}$ — $5s \ ^{2}S$ $5p \ ^{2}P^{\circ}$ — $7d \ ^{2}D$ $5s \ ^{2}S$ — $6p \ ^{2}P^{\circ}$ $4p \ ^{2}P^{\circ}$ — $4d \ ^{2}D$	3/2 - 1/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$
16750,56 16718,96 13150,76 13123,41 12757,26	12 11 14 15 4	4,09 4,09 3,14 3,14 4,02	4,83 4,83 4,09 4,09 4,99	$4p^{2}P^{\circ}$ — $4d^{2}D$ $4p^{2}P^{\circ}$ — $4d^{2}D$ $4s^{2}S$ — $4p^{2}P^{\circ}$ $4s^{2}S$ — $4p^{2}P^{\circ}$ $3d^{2}D$ — $5p^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
12749,83 12747,65 11254,881 11253,190 10891,733	21 2 15 14 11	4,02 4,02 4,02 4,02 4,09	4,99 4,99 5,12 5,12 5,22	3d ² D—5p ² P° 3d ² D—5p ² P° 3d ² D—4f ² F° 3d ² D—4f ² F° 4p ² P°—6s ² S	$\begin{array}{c} 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 7/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 1/_2 \end{array}$
10872,975 10786,770 10782,045 10768,364 9172,14	10 4 9 8 4	4,09 4,09 4,09 4,09 4,02	5,22 5,24 5,24 5,24 5,37	$4p ^{2}P^{\circ} - 6s ^{2}S$ $4p ^{2}P^{\circ} - 5d ^{2}D$ $4p ^{2}P^{\circ} - 5d ^{2}D$ $4p ^{2}P^{\circ} - 5d ^{2}D$ $3d ^{2}D - 6p ^{2}P^{\circ}$	$^{1/2}_{3/2}$ $^{1/2}_{3/2}$ $^{3/2}_{2}$ $^{5/2}_{2}$ $^{1/2}_{2}$ $^{3/2}_{2}$ $^{1/2}_{2}$
9170,86 9163,261 9139,950 9089,906 8925,504	5 2 6 5 4	4,02 7,03 7,03 7,02 4,09	5,37 8,39 8,39 8,39 5,48	$3d^{2}D-6p^{2}P^{\circ}$ $3p^{2}^{2}P-3d^{2}D^{\circ}$ $3p^{2}^{2}P-3d^{2}D^{\circ}$ $3p^{2}^{2}P-3d^{2}D^{\circ}$ $4p^{2}P^{\circ}-6d^{2}D$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
8923 ,555 8912 ,900 8841 ,277 8828 ,909 8773 ,896	9 7 10 8 14	4,09 4,09 4,09 4,09 4,02	5,48 5,48 5,49 5,49 5,43	$4p \ ^{2}P^{\circ}-6d \ ^{2}D$ $4p \ ^{2}P^{\circ}-6d \ ^{2}D$ $4p \ ^{2}P^{\circ}-7s \ ^{2}S$ $4p \ ^{2}P^{\circ}-7s \ ^{2}S$ $3d \ ^{2}D-5f \ ^{2}F^{\circ}$	$ \begin{array}{c} 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 5/_2 - 7/_2 \end{array} $
8772,866 8076,298 8075,353 8065,968 8003,186	13 2 8 6 7	4,02 4,09 4,09 4,09 4,09	5,43 5,62 5,62 5,62 5,64	$3d^{2}D-5f^{2}F^{\circ}$ $4p^{2}P^{\circ}-7d^{2}D$ $4p^{2}P^{\circ}-7d^{2}D$ $4p^{2}P^{\circ}-7d^{2}D$ $4p^{2}P^{\circ}-8s^{2}S$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
7993,048 7836,134 7835,309 7615,339 7614,820	5 12 11 1 7	4,09 4,02 4,02 4,09 4,09	5,64 5,60 5,60 5,71 5,71	$4p\ ^{2}P^{\circ}-8s\ ^{2}S$ $3d\ ^{2}D-6f\ ^{2}F^{\circ}$ $3d\ ^{2}D-6f\ ^{2}F^{\circ}$ $4p\ ^{2}P^{\circ}-8d\ ^{2}D$ $4p\ ^{2}P^{\circ}-8d\ ^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2, & 7/2 \\ 3/2 - 5/2, & 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
7606,159 7563,214 7554,162 7362,297 7361,568	5 3 1 9 8	4,09 4,09 4,09 4,02 4,02	5,71 5,72 5,72 5,70 5,70	$4p ^{2}P^{\circ} - 8d ^{2}D$ $4p ^{2}P^{\circ} - 9s ^{2}S$ $4p ^{2}P^{\circ} - 9s ^{2}S$ $3d ^{2}D - 7f ^{2}F^{\circ}$ $3d ^{2}D - 7f ^{2}F^{\circ}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
7084,644 7083,968 6698,673 6696,023 5557,948	6 5 11 13 8	4,02 4,02 3,14 3,14 3,14	5,77 5,77 4,99 4,99 5,37	3d ² D-8f ² F° 3d ² D-8f ² F° 4s ² S-5p ² P° 4s ² S-5p ² P° 4s ² S-6p ² P°	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
5557,063 5107,943 5107,520 260	10 4 6	3,14 3,14 3,14	5,37 5,57 5,57	4s ² S-6p ² P° 4s ² S-7p ² P° 4s ² S-7p ² P°	$\begin{array}{c} 1/2 & 3/2 \\ 1/2 & 3/2 \\ 1/2 & 1/2 \\ 1/2 & 3/2 \end{array}$

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λ, Ä	I	E _H , eV	E _B , eV	Transition	J
3961,5200 3944,0058	26 24	0,01 0,00	3,14 3,14	$\frac{3p}{3p} ^2P^{\circ}$ - 4s 2S $\frac{3p}{3p} ^2P^{\circ}$ - 4s 2S	$^{3/}_{2}$ $^{-1/}_{2}$ $^{1/}_{2}$ $^{-1/}_{2}$
3935,677 3931,996 3482,628 3479,806 3458,216	4 5 5 5 6	5,24 5,24 4,83 4,83 0,01	8,39 8,39 8,39 8,39 3,60	$5d^{2}D - 3d^{2}D^{\circ} \ 5d^{2}D - 3d^{2}D^{\circ} \ 4d^{2}D - 3d^{2}D^{\circ} \ 4d^{2}D - 3d^{2}D^{\circ} \ 4d^{2}D - 3d^{2}D^{\circ} \ 3p^{2}P^{\circ} - 3p^{2}$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array}$
3452,657 3444,865 3443,640 3439,347 3092,8386	2 6 9 6 20	0,01 0,00 0,01 0,00 0,01	3,60 3,60 3,61 3,60 4,02	$3p \ ^{2}P^{\circ} - 3p^{2} \ ^{4}P$ $3p \ ^{2}P^{\circ} - 3d \ ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3092,7099 3082,1529 3066,145 3064,290 3059,924	26 24 5 7 4	0,01 0,00 3,61 3,60 3,60	4,02 4,02 7,66 7,65 7,65	$3p^{2}P^{\circ}$ 3d ^{2}D $3p^{2}P^{\circ}$ 3d ^{2}D $3p^{2}^{4}P$ 4s $^{4}P^{\circ}$ $3p^{2}^{4}P$ 4s $^{4}P^{\circ}$ $3p^{2}^{4}P$ 4s $^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
3059,029 3057,144 3054,679 3050,073 2913,267	4 14 5 13 3	3,60 3,61 3,60 3,60 5,24	7,66 7,67 7,66 7,67 9,49	$3p^{2} ^{4}P - ^{4}s ^{4}P^{\circ} \ 3p^{2} ^{4}P - ^{4}s ^{4}P^{\circ} \ 3p^{2} ^{4}P - ^{4}s ^{4}P^{\circ} \ 3p^{2} ^{4}P - ^{4}s ^{4}P^{\circ} \ 5d ^{2}D - ^{4}d ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
2902,258 2894,228 2840,205 2840,099 2837,963	2 3 2 7 7	5,48 5,48 4,02 4,02 4,02	9,75 9,76 8,39 8,39 8,39	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2 $ 5/2 - 7/2 $ $ 5/2 - 3/2 $ $ 3/2 - 3/2 $ $ 5/2 - 5/2$
2837,856 2748,065 2740,980 2660,386 2657,406	$\begin{array}{c} 2 \\ 3 \\ 4 \\ 12 \\ 3 \end{array}$	4,02 5,24 5,24 0,01 4,83	8,39 9,75 9,76 4,67 9,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 7/2$ $3/2 - 1/2$ $5/2 - 5/2$
2652,475 2575,397 2575,095 2567,983 2519,514	12 8 10 10 1	0,00 0,01 0,01 0,00 4,83	4,67 4,83 4,83 4,83 9,75	$3p^{2}P^{\circ}-5s^{2}S$ $3p^{2}P^{\circ}-4d^{2}D$ $3p^{2}P^{\circ}-4d^{2}D$ $3p^{2}P^{\circ}-4d^{2}D$ $4d^{2}D-6s^{2}P^{\circ}$	1/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 3/2$ $5/2 - 5/2$
2519,222 2513,305 2378,395 2374,496 2373,571	4 5 7 4 8	4,83 4,83 0,01 3,61 3,61	9,75 9,76 5,22 8,83 8,83	$\begin{array}{c} 4d\ ^2D-6s\ ^2P^\circ \\ 4d\ ^2D-6s\ ^2P^\circ \\ 3p\ ^2P^\circ-6s\ ^2S \\ 3p^2\ ^4P-3d\ ^4D^\circ \\ 3p^2\ ^4P-3d\ ^4D^\circ \end{array}$	3/2 - 5/2 $5/2 - 7/2$ $3/2 - 1/2$ $5/2 - 3/2$ $5/2 - 5/2$
2373,351 2373,122 2372,070 2372,070 2370,726	15 7 5 10 6	0,01 0,01 0,00 3,61 3,60	5,24 5,24 5,22 8,84 8,83	$3p^{2}P^{\circ}-5d^{2}D$ $3p^{2}P^{\circ}-5d^{2}D$ $3p^{2}P^{\circ}-6s^{2}S$ $3p^{2}P^{\circ}-3d^{4}D^{\circ}$ $3p^{2}P^{\circ}-3d^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
2370 ,225 2369 ,304 2368 ,112 2367 ,611 2367 ,053	9 10 8 8 6	3,60 3,60 3,60 3,60 0,00	8,83 8,83 8,83 8,83 5,24	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$ $3p {}^{2}P^{\circ} - 5d {}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
2321,562 2319,057 2317,482 2314,983 2313,526	9 5 7 4 6	3,61 3,61 3,60 3,60 3,60	8,95 8,96 8,95 8,96 8,96	$3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
2312,491 2311,035	5 4	3,60 3,60	8,96 8,96	$3p^{2} {}^{4}P - 3d {}^{4}P^{\circ} \\ 3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{1}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{1}{2}$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2269 ,222 2269 ,096 2266 ,014	1 7 3	0,01 0,01 4,02	5,48 5,48 9,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 3/2 $ 3/2 - 5/2 $ $ 5/2 - 5/2$
2263,738 2263,463 2258,008 2210,060 2204,668 2204,619	1 7 1 2 1	0,01 0,00 0,00 0,01 0,00 0,01	5,49 5,48 5,49 5,62 5,62 5,64	$3p \ ^{2}P^{\circ}-7s \ ^{2}S$ $3p \ ^{2}P^{\circ}-6d \ ^{2}D$ $3p \ ^{2}P^{\circ}-7s \ ^{2}S$ $3p \ ^{2}P^{\circ}-7d \ ^{2}D$ $3p \ ^{2}P^{\circ}-7d \ ^{2}D$ $3p \ ^{2}P^{\circ}-8s \ ^{2}S$	3/2— $1/2$ $1/2$ — $3/2$ $1/2$ — $1/2$ $3/2$ — $3/2$, $5/2$ $1/2$ — $3/2$ $3/2$ — $1/2$
2199,183 2180,996 2177,396 2174,071 2168,826	1 8 6 2 2	0,00 3,14 3,14 0,01 0,00	5,64 8,82 8,83 5,71 5,71	$3p^{2}P^{\circ}-8s^{2}S$ $4s^{2}S-3d^{2}P^{\circ}$ $4s^{2}S-3d^{2}P^{\circ}$ $3p^{2}P^{\circ}-8d^{2}D$ $3p^{2}P^{\circ}-8d^{2}D$	$^{1/_{2}-^{1/_{2}}}_{^{1/_{2}-^{3/_{2}}}}_{^{1/_{2}-^{3/_{2}}}}_{^{1/_{2}-^{1/_{2}}}}_{^{3/_{2}-^{3/_{2}}}},\ ^{5/_{2}}_{^{1/_{2}-^{3/_{2}}}}$
2164,915 2160,388 2150,699 2145,555 2134,733	2 3 5 3 2	4,02 4,02 0,01 0,00 0,01	9,75 9,76 5,78 5,78 5,82	$3d^{2}D-6s^{2}P^{\circ} \ 3d^{2}D-6s^{2}P^{\circ} \ 3p^{2}P^{\circ}-9d^{2}D \ 3p^{2}P^{\circ}-9d^{2}D \ 3p^{2}P^{\circ}-10d^{2}D$	$ \begin{array}{c} 3/2 - \frac{1}{2} \\ 5/2 - \frac{3}{2} \\ 3/2 - \frac{5}{2} \\ 1/2 - \frac{3}{2} \\ 3/2 - \frac{5}{2} \end{array} $
2129,663 2123,362 1769,140 1766,385 1765,636 1762,899	1 1 4 4 4 2	0,00 0,01 0,01 0,01 0,00 0,00	5,82 5,85 7,02 7,03 7,02 7,03	$3p \ ^2P^{\circ}$ — $10d \ ^2D$ $3p \ ^2P^{\circ}$ — $11d \ ^2D$ $3p \ ^2P^{\circ}$ — $3p^2 \ ^2P$ $3p \ ^2P^{\circ}$ — $3p^2 \ ^2P$ $3p \ ^2P^{\circ}$ — $3p^2 \ ^2P$ $3p \ ^2P^{\circ}$ — $3p^2 \ ^2P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \end{array} $

Al II, ground state $1s^2\ 2s^2\ 2p^6\ 3s^2\ ^1S_0$ Ionization potential 151 860,4 cm $^{-1}$; 18,827 eV

λ, Å	I	$E_{ m H}^{}$, eV	$E_{ m B},~{ m eV}$	Transition	J
10107,19 10077,32 10076,29 9331,979 9331,546	$\left\{\begin{array}{c}4\\1\\6\\2\\3\end{array}\right\}$	11,85 11,85 11,85 15,31	13,07 13,07 13,07 16,64	3d ³ D-4p ³ P° 3d ³ D-4p ³ P° 3d ³ D-4p ³ P° 4f ¹ F°-5g ¹ G	2—1 2—2 3—2 3—4
9290,747 9290,649 9288,550 9288,145 9286,794 9286,578	5 6 2 3 2 1 }	15,30 15,30 15,30 15,30 15,30	16,64 16,64 16,64 16,64	4f 3F°—5g 3G 4f 3F°—5g 3G 4f 3F°—5g 3G 4f 3F°—5g 3G 4f 3F°—5g 3G	4-3, 4, 5 4-3, 4 3-3, 4 3-3, 4 2-3
9249,41 8858,39 8680,31 8675,28	1 1 3 1	16,64 16,57 16,54 16,54	17,98 17,97 17,97 17,97	$5g ^{1}G$ — $8h ^{1}H^{\circ}$ $5f ^{1}F^{\circ}$ — $8g ^{1}G$ $5f ^{3}F^{\circ}$ — $8g ^{3}G$ $5f ^{3}F^{\circ}$ — $8g ^{3}G$	4—5 3—4 4—3, 4, 5 3—3, 4
8674,92 8671,28 8640,7 8363,52 8363,30	2 1 8 8 1	16,54 16,54 11,82 15,06 15,06	17,97 17,97 13,26 16,54 16,54	$5f \ ^3F^{\circ} - 8g \ ^3G \ 5f \ ^3F^{\circ} - 8g \ ^3G \ 4s \ ^1S - 4p \ ^1P^{\circ} \ 4d \ ^3D - 5f \ ^3F^{\circ} \ 4d \ ^3D - 5f \ ^3F^{\circ}$	$ \begin{array}{c} 3-3, \ 4 \\ 2-3 \\ 0-1 \\ 1-2 \\ 2-2 \end{array} $
8359,57 8359,23 8354,35 8160,15 8119,72	9 1 10 3 1,5	15,06 15,06 15,06 16,64 16,47	16,54 16,54 16,54 18,15 17,99	$4d\ ^3D-5f\ ^3F^{\circ}\ 4d\ ^3D-5f\ ^3F^{\circ}\ 4d\ ^3D-5f\ ^3F^{\circ}\ 5g\ ^1G-9h\ ^1H^{\circ}\ 5d\ ^3D-8f\ ^3F^{\circ}$	2—3 3—3 3—4 4—5 3—4
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815,83	<u>-</u>				<u> </u>	
815,83	λ, Å	Ι	E _H , eV	ξE_{B} , eV	Transition	J
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7823,72 7815,83 7635,33 7627,85 7471,37	1 2 1	15,58 15,58 15,58	17,17 17,21 17,21	$5p \ ^{3}P^{\circ}$ —7s ^{3}S $5p \ ^{3}P^{\circ}$ —6d ^{3}D $5p \ ^{3}P^{\circ}$ —6d ^{3}D	1-1 2-1, 2, 3 1-1, 2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7449,12 7063,624 7056,56 7042,056 6919,96	3 4 5	11,32 11,32 11,32	13,07 13,07 13,08	4s 3S-4p 3P° 4s 3S-4p 3P° 4s 3S-4p 3P°	1—0 1—1 1—2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6917,93 6837,094 6823,382 6816,827 6335,70	3 2 1	13,07 13,07 13,07	14,89 14,89 14,89	$4p\ ^{3}P^{\circ}-5s\ ^{3}S \ 4p\ ^{3}P^{\circ}-5s\ ^{3}S \ 4p\ ^{3}P^{\circ}-5s\ ^{3}S$	2—1 1—1 0—1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6243,347 6231,759 6226,193 6201,70 6201,52	7 5 9 1	13,07 13,07	15,06 15,06	$^{4p}_{4p} ^{3}P^{\circ} - ^{4}d ^{3}D \ ^{4p}_{4p} ^{3}P^{\circ} - ^{4}d ^{3}D$	$\begin{array}{c} 1-2 \\ 0-1 \end{array}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6183,42 6182,45 6182,28 6181,68 6181,57	10 7 8 6	15,30 15,30 15,30	17,30 17,30 17,30	$4f \ ^{3}F^{\circ} - 6g \ ^{3}G$ $4f \ ^{3}F^{\circ} - 6g \ ^{3}G$ $4f \ ^{3}F^{\circ} - 6g \ ^{3}G$	$ \begin{array}{c} 3-3, & 4 \\ 3-3, & 4 \\ 2-3 \end{array} $
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	6073 ,17 6068 ,37 6066 ,40 6061 ,06 6006 ,38	1 2 6	15,58 15,58 15,60	17,63 17,63 17,65	$5p \ ^{3}P^{\circ}-8s \ ^{3}S \ 5p \ ^{3}P^{\circ}-8s \ ^{3}S \ 5p \ ^{1}P^{\circ}-8s \ ^{1}S \ 5p \ ^{3}P^{\circ}-7d \ ^{3}D$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 1-0 \\ 2-1, 2, 3 \end{array} $
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	6001,81 6001,18 5999,83 5972,05 5867,81	1 2 5	16,46 15,58 15,60	18,56 17,65 17,68 17,17	$^{6}s^{1}S$ — $^{1}P^{\circ}$ $^{5}p^{3}P^{\circ}$ — $^{7}d^{3}D$ $^{5}p^{1}P^{\circ}$ — $^{7}d^{1}D$ $^{4}d^{3}D$ — $^{6}f^{3}F^{\circ}$	0-1 $0-1$ $1-2$ $1-2$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5853,62 5613,19 5593,23	5 3 10	15,06 15,47 13,26	17,19 17,68 15,47	$4d\ ^3D-6f\ ^3F^\circ \ 4d\ ^1D-7f\ ^1F^\circ \ 4p\ ^1P^\circ-4d\ ^1D$	3—4 2—3 1—2 2—1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5371 ,84 5324 ,61 5316 ,07	1 4 7	15,06 15,60 15,58	17,37 17,93 17,92	$4d\ ^{3}D-7p\ ^{3}P^{\circ} \ 5p\ ^{1}P^{\circ}-9s\ ^{1}S \ 5p\ ^{3}P^{\circ}-9s\ ^{3}S$	2, 3—1, 2 1—0 2—1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5285,85 5283,77 5280,21	6 8 6	15,60 15,58 15,58	17,95 17,93 17,93	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 2-1, 2, 3 \\ 1-1, 2 \end{array} $
$5144,998$ 1 15,30 17,71 $4f$ 3F ° $-7g$ 3G 3 -3 , 4 $5100,34$ 1 15,06 17,49 $4d$ 3D $-3d$ 3F ° 1 -2	5276,81 5276,42 5158,187	$egin{array}{c} 2 \ 2 \ 1 \end{array}$	15,30 15,30 15,31	17 ,65 17 ,65 17 ,71	$4f^{3}F^{\circ}$ — $7d^{3}D$ $4f^{3}F^{\circ}$ — $7d^{3}D$ $4f^{1}F^{\circ}$ — $7g^{1}G$	$\begin{array}{c} 3-2,\;3\\ 2-1,\;2,\;3\end{array}$
	5144,998 5100,34	1	15,06	17,49	$4d ^3D - 3d ^3F^{\circ}$	1-2

λ, Å	I	$E_{ m H}$, eV	$E_{ m B}$, eV	Transition	J
5085,02 5000,97	4 3	15,06 15,47	17,50 17,95	4d ³ D-3d ³ F° 4d ¹ D-8f ¹ F°	3—4 2—3
4962,10 4918,98 4902,77 4899,64 4898,76	3 3 5 3 5	15,47 15,60 15,58 15,58 15,60	17,97 18,12 18,41 18,11 18,13	$4d ^{1}D - 9p ^{1}P^{\circ}$ $5p ^{1}P^{\circ} - 10s ^{1}S$ $5p ^{3}P^{\circ} - 10s ^{3}S$ $5p ^{3}P^{\circ} - 10s ^{3}S$ $5p ^{1}P^{\circ} - 9d ^{1}D$	$ \begin{array}{c} 2-1 \\ 1-0 \\ 2-1 \\ 1-1 \\ 1-2 \end{array} $
4898,52 4666,8 4663,054 4650,646 4650,544	$\begin{array}{c} 2 \\ 11 \\ 10 \\ 1,5 \\ 2 \end{array}$	15,58 15,60 10,60 15,31	18,11 18,26 13,26 17,97	5p ³ P°—10s ³ S 5p ¹ P°—11s ¹ S 3p ² ¹ D—4p ¹ P° 4f ¹ F°—8g ¹ G	0-1 $1-0$ $2-1$ $3-4$
4648,62 4640,384 4640,362 4639,833	1 3,5 4	15,47 } 15,30	18,14 17,97	4d ¹ D—10p ¹ P ⁹ 4f ³ F°—8g ³ G	2-1 4-3, 4, 5
4639,725	1,5 2	§ 15,30	17,97	$4f \ ^3F^{\circ}$ — $8g \ ^3G$	3—3,4
4639,384 4635,7 4629,7 4609,7 4589,75	1 1 1 1 4	15,30 15,58 15,05 15,06 15,06	17,97 18,26 17,72 17,75 17,76	$4f ^3F^{\circ} - 8g ^3G$ $5p ^3P^{\circ} - 10d ^3D$ $5s ^1S - 8p ^1P^{\circ}$ $4d ^3D - 8p ^3P^{\circ}$ $4d ^3D - 7f ^3F^{\circ}$	$\begin{array}{c} 2-3 \\ 2-1, 2, 3 \\ 0-1 \\ 1, 2, 3-0, 1, 2 \\ 1-2 \end{array}$
4589,689 4588,194 4585,82 4447,8 4356,807 4356,711	1 5 6 3 1,5	15,06 15,06 15,06 15,47 } 15,31	17,76 17,76 17,76 18,26 18,15	$4d\ ^{3}D-7f\ ^{3}F^{\circ}\ 4d\ ^{3}D-7f\ ^{3}F^{\circ}\ 4d\ ^{3}D-7f\ ^{3}F^{\circ}\ 4d\ ^{1}D-11p\ ^{1}P^{\circ}\ 4f\ ^{1}F^{\circ}-9g\ ^{1}G$	2-2 2-3 3-4 2-1 3-4
4347,802 4347,785 4347,316 4347,223		} 15,30 } 15,30	18,15 18,15	4f ³ F°—9g ³ G 4f ³ F°—9g ³ G	4-3, 4, 5 3-3, 4
4346,918 4307,20 4240,75 4227,982 4227,923	1 3 3 4 1,5	15,30 15,47 15,05 15,06 15,06	18,15 18,35 17,97 17,99 17,99	4f ³ F°-9g ³ G 4d ¹ D-4s ¹ P° 5s ¹ S-9p ¹ P° 4d ³ D-8f ³ F° 4d ³ D-8f ³ F°	$ \begin{array}{c} 2-3 \\ 2-1 \\ 0-1 \\ 1-2 \\ 2-2 \end{array} $
4227,493 4227,406 4226,812 4202,40 4168,424	5 2 6 2 1	15,06 15,06 15,06 15,47 15,31	17,99 17,99 17,99 18,42 18,28	$4d\ ^3D - 8f\ ^3F^\circ$ $4d\ ^3D - 8f\ ^3F^\circ$ $4d\ ^3D - 8f\ ^3F^\circ$ $4d\ ^1D - 12p\ ^1P^\circ$ $4f\ ^1F^\circ - 10g\ ^1G$	2-3 3-3 3-4 2-1 3-4
4160,263 4160,239 4159,809 4159,725 4159,450	3 2,5 1 1,5	15,30 15,30 15,30 15,30 15,30	18,28 18,28 18,28 18,28 18,28	$4f {}^{3}F^{\circ} - 10g {}^{3}G$ $4f {}^{3}F^{\circ} - 10g {}^{3}G$ $4f {}^{3}F^{\circ} - 10g {}^{3}G$ $4f {}^{3}F^{\circ} - 10g {}^{3}G$ $4f {}^{3}F^{\circ} - 10g {}^{3}G$	4-3, 4, 5 4-3, 4, 5 3-3, 4 3-3, 4 2-3
4026,5 4009,58 3996,381 3996,159 3996,075	5 1 3 4 1	13,65 15,05 15,06 15,06 15,06	16,73 18,14 18,16 18,16 18,16	3d ¹ D-6p ¹ P° 5s ¹ S-10p ¹ P° 4d ³ D-9f ³ F° 4d ³ D-9f ³ F° 4d ³ D-9f ³ F°	$ \begin{array}{c} 2-1 \\ 0-1 \\ 1-2 \\ 2-3 \\ 3-3 \end{array} $
3995,86 3900,680 3866,160 3859,33 3842,317	5 10 2 3 1	15,06 7,42 13,26 15,05 15,06	18,16 10,60 16,46 18,26 18,29	$4d\ ^3D - 9f\ ^3F^\circ \ 3p\ ^1P^\circ - 3p^2\ ^1D \ 4p\ ^1P^\circ - 6s\ ^1S \ 5s\ ^1S - 11p\ ^1P^\circ \ 4d\ ^3D - 10f\ ^3F^\circ$	$ \begin{array}{r} 3-4 \\ 1-2 \\ 1-0 \\ 0-1 \\ 1-2 \end{array} $

λ, λ	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
	-	H, CV	В,		
$3842,213 \\ 3842,037$	$\frac{2}{3}$	$15,06 \\ 15,06$	$18,29 \\ 18,29$	4d ³ D—10f ³ F° 4d ³ D—10f ³ F°	2—3 3—4
3753,10 3738,003	1 3	15,05 13,08	18,35 16,39	$5s {}^{1}S - 4s {}^{1}P^{\circ} $ $4p {}^{3}P^{\circ} - 6s {}^{3}S$	0—1 2—1
3734,567	1	15,06	18,37	$4d ^3D - 11f ^3F^\circ$	3—4
3733,910 3731,950	2 1	13,07 13,07	16,39 16,39	$4p \ ^{3}P^{\circ}-6s \ ^{3}S$ $4p \ ^{3}P^{\circ}-6s \ ^{3}S$	$ \begin{array}{c} 1 - 1 \\ 0 - 1 \\ \end{array} $
3703,217 3655,00	4 8	13,26 13,08	16,60 16,47	$4p ^{1}P^{\circ} - 5d ^{1}D$ $4p ^{3}P^{\circ} - 5d ^{3}D$	1—2 2—3
3654,979 3651,090	4 4	13,08 13,07	16,47 $16,47$	$4p \ ^3P^{\circ} - 5d \ ^3D$ $4p \ ^3P^{\circ} - 5d \ ^3D$	2-1, 2 $1-1, 2$
3651,064 3649,221	6	13,07	16,47	$4p \ ^{3}P^{\circ}-5d \ ^{3}D$	1—1, 2
3649,182 3597,50	$\stackrel{1}{\underset{2}{1}},5$	3,07 15,06	16,47 18,51	4p ³ P°-5d ³ D 4d ³ D-13f ³ F°	0-1 $3-2, 3, 4$
3587,441	7	11,85	15,30	$3d ^3D - 4f ^3F^{\circ}$	1—2
3587 ,327 3587 ,176	$\begin{array}{c} 2 \\ 1 \end{array}$	85, 11 11,85	15,30 15,30	$3d\ ^{3}D-4f\ ^{3}F^{\circ}$ $3d\ ^{3}D-4f\ ^{3}F^{\circ}$	$\begin{array}{c} 2-2 \\ 3-2 \\ \end{array}$
3587 ,057 3586 ,908	8 3,5	85, 11 11,85	15,30 15,30	3d 3D-4f 3F° 3d 3D-4f 3F°	2—3 3—3
3586,692 3586,546	$\frac{2}{9}$	11,85 11,85	15,30 15,30	3d ³ D-4f ³ F° 3d ³ D-4f ³ F°	2—4 3—4
3552,00 3428,916	1 6	15,06 13,65	18,55 17,26	$4d ^{3}D - 14f ^{3}F^{\circ} \\ 3d ^{1}D - 6f ^{1}F^{\circ}$	$\begin{array}{c} 3-2,\ 3,\ 4\\ 2-3 \end{array}$
3351,456	3	13,65	17,35	$3d {}^{1}\!D - 7p {}^{1}P^{\circ}$	2—1
3315,614 3314,889	$\frac{1}{2}$	11,85 11,85	15,58 15,58	3 <i>d</i> 3 <i>D</i> —5 <i>p</i> 3 <i>P</i> ° 3 <i>d</i> 3 <i>D</i> —5 <i>p</i> 3 <i>P</i> °	$\begin{array}{c} 1 - 0 \\ 2 - 1 \end{array}$
3313 ,351 3275 ,776	3 4	11 ,85 11 ,82	15,58 15,60	$3d ^3D - 5p ^3P^{\circ}$ $4s ^1S - 5p ^1P^{\circ}$	3—2 0—1
3135,875 3088,523	5 3	13,26 13,26	17,21 17,27	$4p ^{1}P^{\circ} - 7s ^{1}S$ $4p ^{1}P^{\circ} - 6d ^{1}D$	1-0 $1-2$
3074,665	6 6	13,65 13,65 13,65	17,68 17,72	$3d ^{1}D - 7f ^{1}F^{\circ}$ $3d ^{1}D - 8p ^{1}P^{\circ}$	$\begin{array}{c} \bar{2} - \bar{3} \\ 2 - 1 \end{array}$
3041 ,278 3026 ,762	1,5 1	13,08 13,08 13,07	17,17 17,17 17,17	$4p {}^{3}P^{\circ} - 7s {}^{3}S$ $4p {}^{3}P^{\circ} - 7s {}^{3}S$	$\frac{2}{1}$
3024 ,074 3001 ,82	3	_	_	· _	_
2998 ,174 2995 ,524	$\frac{2}{1,5}$		17,21 17,21	$4p ^3P^{\circ} - 6d ^3D$ $4p ^3P^{\circ} - 6d ^3D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
$2994,280 \\ 2924,52$	$\frac{1}{3}$	13 <u>,</u> 07 —	17,21 —	4p 3P°—6d 3D —	0 <u>—1</u> —
2903,19	1 2	$\frac{11}{32}$ $\frac{32}{11}$	15,58 15,58	${}^{4s}{}^{3}S - 5p \; {}^{3}P^{\circ} \ {}^{4s}{}^{3}S - 5p \; {}^{3}P^{\circ}$	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
2902,08 2884,20	4 4	13,65	17,95	$3d ^{1}D - 8f ^{1}F^{\circ}$	
$2881,463 \\ 2868,52$	9	13,65	17,97	$3d {}^{1}D - 9p {}^{1}P^{\circ}$	2—1
2820,632 2816,179	$\frac{1}{20}$	$^{13}, 26$ $^{7}, 42$	17,65 11,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1 - 0 \\ 1 - 0 \\ - \end{array}$
2805,65 $2762,460$ $2760,852$	4 2 1	13,65 13,65	18,13 18,14	3d ¹ D—9f ¹ F° 3d ¹ D—10p ¹ P°	$\begin{array}{c} 2 - 3 \\ 2 - 1 \end{array}$
2723,091	2	13,08	17,63	$4p {}^{3}P^{\circ} - 8s {}^{3}S \ 4p {}^{3}P^{\circ} - 8s {}^{3}S$	2—1 1—1
2720 ,918 2709 ,582	1 1,5		17,63 17,65	$4p ^3P ^{\circ} - 7d ^3D$ $3d ^1D - 11p ^1P ^{\circ}$	2—1, 2, 3 2—1
$2688,728 \\ 2683,280$	2 3	13,65 $13,65$	$18,26 \\ 18,27$	$3d ^{1}D - 10f ^{1}F^{\circ}$	2 —3
2669,166	10 4	$0,00 \\ 13,26$	4,64 17,93	$3s^{2} {}^{1}S$ $-3p {}^{3}P^{\circ}$ $4p {}^{1}P^{\circ}$ $-9s {}^{1}S$	0—1 1—0
$2650,10 \\ 2640,36$	3	13,26	17,95	$4p {}^{1}P^{\circ} - 8d {}^{1}D$	1-2

λ, Λ	I	$E_{ m H}^{},~{ m eV}$	E_{B} , eV	Transition	J
2638,695 2638,263	3 4	11,85 11,85	16,54 16,54	3d ³ D-5f ³ F° 3d ³ D-5f ³ F°	1—2 2—3
2637,696 2636,725 2635,17 2635,03 2631,553	5 6 1 3 7	11,85 13,65 10,60 10,60 10,60	16,54 18,35 15,30 15,30 15,31	$3d\ ^3D - 5f\ ^3F^\circ \ 3d\ ^1D - 4s\ ^1P^\circ \ 3p^2\ ^1D - 4f\ ^3F^\circ \ 3p^2\ ^1D - 4f\ ^3F^\circ \ 3p^2\ ^1D - 4f\ ^1F^\circ \ $	3—4 2—1 2—2 2—3 2—3
2627,68 2597,18 2586,95 2565,68 2559,614	7 6 6 4 3	13,65 13,65 13,65 13,65 13,08	18,37 18,42 18,44 18,48 17,92	$3d ^{1}D - 11f ^{1}F^{\circ} \ 3d ^{1}D - 12p ^{1}P^{\circ} \ 3d ^{1}D - 12f ^{1}F^{\circ} \ 3d ^{1}D - 13p ^{1}P^{\circ} \ 4p ^{3}P^{\circ} - 9s ^{3}S$	2-3 2-1 2-3 2-1 2-1
2557,71 2556,78 2556,01 2552,12 2550,23	5 3 4 5 3	13,07 13,07 13,65 13,08 13,07	17,92 17,92 18,50 17,93 17,93	4p ³ P°—9s ³ S 4p ³ P°—9s ³ S 4d ¹ D—13f ¹ F° 4p ³ P°—8d ³ D 4p ³ P°—8d ³ D	1-1 0-1 2-3 2-1, 2, 3 1-1, 2
2549,30 2545,60 2540,70 2540,12 2533,16	1,5 6 1 4	13,07 13,26 13,65 13,26 11,85	17,93 18,12 18,53 18,13 16,74	$4p ^{3}P^{\circ} - 8d ^{3}D$ $4p ^{1}P^{\circ} - 10s ^{1}S$ $3d ^{1}D - 14p ^{1}P^{\circ}$ $4p ^{1}P^{\circ} - 9d ^{1}D$ $3d^{3}D - 6p ^{3}P^{\circ}$	0—1 1—0 2—1 1—2 2—1
2532,655 2532,10 2526,477 2520,64 2513,15	2 3 1 2 1	11,85 13,65 11,82 13,65 13,65	16,74 18,54 16,73 18,57 18,58	$3d\ ^3D-6p\ ^3P^\circ \ 3d\ ^1D-14f\ ^1F^\circ \ 4s\ ^1S-6p\ ^1P^\circ \ 3d\ ^1D-15p\ ^1P^\circ \ 3d\ ^1D-15f\ ^1F^\circ \ $	3-2 2-3 0-1 2-1 2-3
2504,25 2497,85 2485,35 2476,30 2475,260	1 2 1 4 4	13,65 13,65 13,65 13,26 10,60	18,60 18,61 18,63 18,26 15,60	$3d^{1}D-16p^{1}P^{\circ} \ 3d^{1}D-16f^{1}F^{\circ} \ 3d^{1}D-17f^{1}F^{\circ} \ 4p^{1}P^{\circ}-11s^{1}S \ 3p^{2^{1}}D-5p^{1}P^{\circ}$	$ \begin{array}{r} 2-1 \\ 2-3 \\ 2-3 \\ 1-0 \\ 2-1 \end{array} $
2472,95 2459,82 2458,05 2457,20 2455,22	1 4 2 1 2	13,26 13,08 13,07 13,07 13,08	18,27 18,11 18,11 18,11 18,12	$4p ^{1}P^{\circ}$ — $10d ^{1}D$ $4p ^{3}P^{\circ}$ — $10s ^{3}S$ $4p ^{3}P^{\circ}$ — $10s ^{3}S$ $4p ^{3}P^{\circ}$ — $10s ^{3}S$ $4p ^{3}P^{\circ}$ — $9d ^{3}D$	$ \begin{array}{r} 1-2 \\ 2-1 \\ 1-1 \\ 0-1 \\ 2-1 ,2,3 \end{array} $
2453,47 2427,70 2393,835 2392,15 2391,35	1 3 2 4 1	13,07 13,26 13,08 13,07 13,07	18,12 18,36 18,25 18,25 18,25	$4p \ ^{3}P^{\circ} - 9d \ ^{3}D$ $4p \ ^{1}P^{\circ} - 12s \ ^{1}S$ $4p \ ^{3}P^{\circ} - 11s \ ^{3}S$ $4p \ ^{3}P^{\circ} - 11s \ ^{3}S$ $4p \ ^{3}P^{\circ} - 11s \ ^{3}S$	$ \begin{array}{c} 1-1, \ 2 \\ 1-0 \\ 2-1 \\ 1-1 \\ 0-1 \end{array} $
2390,755 2389,08 2365,49 2350,20	2 1 1,5 4	13,07 13,07 13,26	18,26 18,26 18,49	$4p \ ^{3}P^{\circ}-10d \ ^{3}D$ $4p \ ^{3}P^{\circ}-10d \ ^{3}D$ $4p \ ^{1}P^{\circ}-14s \ ^{1}S$	2-1, 2, 3 1-1, 2 1-0
2347,54 2345,92 2344,69	2,5 1,5 1	13,08 13,07 13,26	18,36 18,36 18,54	$4p\ ^3P^{\circ}-12s\ ^3S$ $4p\ ^3P^{\circ}-12s\ ^3S$ $4p\ ^1P^{\circ}-15s\ ^1S$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 1-0 \end{array} $
2326,498 2325,497 2324,20	$\begin{array}{c} 2 \\ 3 \\ 4 \end{array}$	11 ,85 11 ,85 11 ,85	17,17 17,18 17,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1 - 2 \\ 2 - 3 \\ 3 - 4 \end{array} $
2313,77 2285,52 2285,17 2243,05 2194,251 266	1 2 3 4 1	13,08 11,32 11,32 11,82 11,85	18,43 16,74 16,74 17,35 17,49	$4p\ ^{3}P^{\circ}-13s\ ^{3}S$ $4s\ ^{3}S-6p\ ^{3}P^{\circ}$ $4s\ ^{3}S-6p\ ^{3}P^{\circ}$ $4s\ ^{1}S-7p\ ^{1}P^{\circ}$ $3d\ ^{3}D-3d\ ^{3}F^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 1-2 \\ 0-1 \\ 2-3 \end{array} $

1, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2192,607 2099,68 2095,2 2094,8 2094,3	1,5 5 5 5,5 6	11 ,85 11 ,82 11 ,85 11 ,85 11 ,85	17,50 17,72 17,76 17,76 17,76	$3d\ ^3D - 3d\ ^3F^\circ$ $4s\ ^1S - 8p\ ^1P^\circ$ $3d\ ^3D - 7f\ ^3F^\circ$ $3d\ ^3D - 7f\ ^3F^\circ$ $3d\ ^3D - 7f\ ^3F^\circ$	3-4 0-1 1-2 2-3 3-4
2087,0 2081,5 2073,8 2047,72 2039,93	5 2 3 1 3	4,66 4,64 10,60 11,32	10,60 10,60 16,57 17,37	$3p ^3P^{\circ} - 3p^2 ^1D$ $3p ^3P^{\circ} - 3p^2 ^1D$ $3p^2 ^1D - 5f ^1F^{\circ}$ $4s ^3S - 7p ^3P^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-2 \\ 2-3 \\ 1-0, 1 \end{array} $
2022,14 2016,09 1990,53 1965,23 1962,67	2 1 7 4 7	10,60 11,85 7,42 11,69 11,35 11,82	16,73 17,99 13,65 18,00 18,16 18,14	$3p^{2} ^{1}D - 6p ^{1}P^{\circ}$ $3d ^{3}D - 8f ^{3}F^{\circ}$ $3p ^{1}P^{\circ} - 3d ^{1}D$ $3p^{2} ^{3}P - 3d ^{3}D^{\circ}$ $3d ^{3}D - 9f ^{3}F^{\circ}$ $4s ^{1}S - 10p ^{1}P^{\circ}$	$\begin{array}{c} 2-1 \\ 1, 2, \begin{array}{c} 3-2, 3, 4 \\ 1-2 \\ 2-3 \\ 1, 2, \begin{array}{c} 3-2, 3, 4 \\ 0-1 \end{array} \end{array}$
1960 ,70 1958 ,29 1945 ,35	3 1 5	11,67 11,66	18,00 18,00 -	$^{3p^2}_{3p^2}^{3P} - ^{3d}_{3D}^{\circ}_{0}$ $^{-}_{-}$	1-1, 2 0-1 -
1939,30 1936,96	5 4	11,69 11,67	18,08 18,07	$3p^2 \ ^3P - 4s \ ^3P^\circ \ 3p^2 \ ^3P - 4s \ ^3P^\circ$	2—1 1—0
1934,75 1934,54 1932,43 1930,03 1926,99	10 10 5 5	11,67 11,69 11,66 11,67 11,32	18,08 18,10 18,08 18,10 17,75	$3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $4s ^{3}S - 8p ^{3}P^{\circ}$	$ \begin{array}{c} 1-1 \\ 2-2 \\ 0-1 \\ 1-2 \\ 1-0, 1, 2 \end{array} $
1925,99 1924,81 1910,91 1906,57 1904,38	2 4 5 4 2	11,82 11,85 11,69 11,67 11,66	18,26 18,29 18,17 18,17 18,17	$4s$ ^{1}S $-11p$ ^{1}P $^{\circ}$ $3d$ ^{3}D $-10f$ ^{3}F $^{\circ}$ $3p^{2}$ ^{3}P $-3d$ ^{3}P $^{\circ}$ $3p^{2}$ ^{3}P $-3d$ ^{3}P $^{\circ}$ $3p^{2}$ ^{3}P $-3d$ ^{3}P $^{\circ}$	$\begin{array}{c} 1, 2, \begin{array}{c} 0-1 \\ 3-2, 3, 4 \\ 2-2 \\ 1-1 \\ 0-1 \end{array}$
1899,17 1897,49 1878,48 1877,13 1862,34	4 2 3 1 15	11,82 11,85 11,82 11,85 4,66	18,35 18,38 18,42 18,45 11,32	$4s$ ^{1}S $-4s$ ^{1}P $^{\circ}$ $3d$ ^{3}D $-11f$ ^{3}F $^{\circ}$ $4s$ ^{1}S $-12p$ ^{1}P $^{\circ}$ $3d$ ^{3}D $-12f$ ^{3}F $^{\circ}$ $3p$ ^{3}P $^{\circ}$ $-4s$ ^{3}S	$1, 2, \begin{array}{c} 0-1 \\ 3-2, 3, 4 \\ 0-1 \\ 1, 2, \begin{array}{c} 3-2, 3, 4 \\ 2-1 \end{array}$
1859,99 1858,05 1855,95 1854,76 1848,90	3 10 8 3 2	$ \begin{array}{c} 10,60 \\ 4,64 \\ 4,64 \\ 11,32 \\ 11,32 \\ 11,85 \\ 11,82 \end{array} $	17,26 11,32 11,32 18,00 18,00 18,55 18,53	$3p^{2} ^{1}D - 6f ^{1}F^{\circ}$ $3p ^{3}P^{\circ} - 4s ^{3}S$ $3p ^{3}P^{\circ} - 4s ^{3}S$ $4s ^{3}S - 3d ^{3}D^{\circ}$ $4s ^{3}S - 9p ^{3}P^{\circ}$ $3d ^{3}D - 14f ^{3}F^{\circ}$ $4s ^{1}S - 14p ^{1}P^{\circ}$	$\begin{array}{c} 2-3\\ 1-1\\ 0-1\\ 1-1,\ 2\\ 1-0,\ 1,\ 2\\ 1,\ 2,\ 3-2,\ 3,\ 4\\ 0-1\end{array}$
1839,64 1838,27 1836,97 1834,82 1832,87	2 1 1 6 8	11,85 11,82 10,60 11,32 11,32	18,58 18,56 17,35 18,05 18,07	$3d\ ^3D-15f\ ^3F^\circ \ 4s\ ^1S-15p\ ^1P^\circ \ 3p^2\ ^1D-7p\ ^1P^\circ \ 4s\ ^3S-4s\ ^3P^\circ \ 4s\ ^3S-4s\ ^3P^\circ$	1, 2, 3-2, 3, 4 0-1 2-1 1-0 1-1
1828,61 1807,40	10 4	11,32 —	18,10 —	4s ³ S-4s ³ P°	1-2
1767,76 1765,82 1764,01	7 4 10	4,66 4,64 4,66	11,67 11,66 11,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 1-0 \\ 2-2 \end{array} $
1763 ,85 1762 ,00 1760 ,15 1750 ,56 1739 ,64	8 5 7 6 5	4,64 4,64 4,64 10,60 10,60	11,67 11,67 11,69 17,68 17,72	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3p^{2} \ ^{1}D - 7f \ ^{1}F^{\circ}$ $3p^{2} \ ^{1}D - 8p \ ^{1}P^{\circ}$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 1-2 \\ 2-3 \\ 2-1 \end{array} $

λ, Α	I	E _H , eV	$E_{ m B}$, eV	Transition	J
1725,01 1721,31 1719,43 1686,19 1681,78	15 10 8 5 5	4,66 4,64 4,64 10,60 10,60	11,85 11,85 11,85 17,95 17,97	$3p \ ^3P^{\circ} - 3d \ ^3D$ $3p \ ^1D - 8f \ ^1F^{\circ}$ $3p \ ^1D - 9p \ ^1P^{\circ}$	2-1, 2, 3 1-1, 2 0-1 2-3 2-1
1670,81	15	0,00	7,42	$3s^{2} ^{1}S - 3p ^{1}P^{\circ}$	0—1
1644,78	5	10,60	18,13	$3p^{2} ^{1}D - 9f ^{1}F^{\circ}$	2—3
1644,15	5	10,60	18,14	$3p^{2} ^{1}D - 10p ^{1}P^{\circ}$	2—1
1625,60	3	7,42	15,05	$3p ^{1}P^{\circ} - 5s ^{1}S$	1—0
1618,38	4	10,60	18,26	$3p^{2} ^{1}D - 14p ^{1}P^{\circ}$	2—1
1616,41	4	10,60	18,27	$3p^{2} ^{1}D - 10f ^{1}F^{\circ}$	2—3
1599,44	3	10,60	18,35	$3p^{2} ^{1}D - 4s ^{1}P^{\circ}$	2—1
1596,02	3	10,60	18,36	$3p^{2} ^{1}D - 11f ^{1}F^{\circ}$	2—3
1584,77	2	10,60	18,42	$3p^{2} ^{1}D - 12p ^{1}P^{\circ}$	2—1
1580,93	2	10,60	18,44	$3p^{2} ^{1}D - 12f ^{1}F^{\circ}$	2—3
1572,97	1	10,60	18,48	$3p^{2} ^{1}D - 13p ^{1}P^{\circ}$	2—1
1569,35	1	10,60	18,50	$3p^{2} ^{1}D - 13f ^{1}F^{\circ}$	2—3
1563,56	1	10,60	18,52	$3p^{2} ^{1}D - 14p ^{1}P^{\circ}$	2—1
1560,35	1	10,60	18,54	$3p^{2} ^{1}D - 14f ^{1}F^{\circ}$	2—3
1539,74	10	7,42	15,47	$3p ^{1}P^{\circ} - 4d ^{1}D$	1—2
1371,26 1350,15 1258,88 1211,93 1210,15	2 6 4 3 2	$7,42 \\ 7,42 \\ 7,42 \\ 4,66 \\ 7,42 \\ 4,64$	16,46 16,60 17,27 14,89 17,65 14,89	$3p ^{1}P^{\circ} - 6s ^{1}S$ $3p ^{1}P^{\circ} - 5d ^{1}D$ $3p ^{1}P^{\circ} - 6d ^{1}D$ $3p ^{3}P^{\circ} - 5s ^{3}S$ $3p ^{1}P^{\circ} - 8s ^{1}S$ $3p ^{3}p^{\circ} - 5s ^{3}s$	1-0 1-2 1-2 2-1 1-0 1-1
1209,19	1	4,64	14,89	$3p ^3P^{\circ} - 5s ^3S$	0-1
1208,35	3	7,42	17,68	$3p ^1P^{\circ} - 7d ^1D$	1-2
1191,86	5	4,66	15,06	$3p ^3P^{\circ} - 4d ^3D$	2-1, 2, 3
1190,07	4	4,64	15,06	$3p ^3P^{\circ} - 4d ^3D$	1-1, 2
1189,21	2	4,64	15,06	$3p ^3P^{\circ} - 4d ^3D$	0-1
1179,38 1177,48 1158,14 1157,13 1152,14	1 4 1 3 4	7,42 7,42 7,42 7,42 —	17,93 17,95 18,12 18,13	3p 1P°—9s 1S 3p 1P°—8d 1D 3p 1P°—10s 1S 3p 1P°—9d 1D	1-0 1-2 1-0 1-2
1142,97	2	7,42	18,26	$3p ^{1}P^{\circ}-10d ^{1}D$	1-2
1049,93	2	4,66	16,47	$3p ^{3}P^{\circ}-5d ^{3}D$	2-1, 2, 3
1048,53	1	4,64	16,47	$3p ^{3}P^{\circ}-5d ^{3}D$	1-1, 2
990,88	1	4,66	17,17	$3p ^{3}P^{\circ}-7s ^{3}S$	2-1
955,99	1	4,66	17,63	$3p ^{3}P^{\circ}-8s ^{3}S$	2-1
935,20	1	0,00	13,26	$3s^{2} ^{1}S-4p ^{1}P^{\circ}$	0-1

Al III, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 S_{1/2}$ Ionization potential 229 453,99 cm $^{-1}$; 28,447 eV

λ, λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
5722,65	6	15,64	17,80	$4s ^2S - 4p ^2P^{\circ}$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2}, \ 7/_{2} - 3/_{2}, \ 5/_{2} \\ 7/_{2}, \ 9/_{2} - 5/_{2}, \ 7/_{2} \\ 7/_{2}, \ 9/_{2} - 9/_{2}, \ 11/_{2} \end{array}$
5696,47	8	15,64	17,81	$4s ^2S - 4p ^2P^{\circ}$	
5260,91	0	23,54	25,89	$5f ^2F^{\circ} - 7d ^2D$	
5172,6	1	23,54	25,94	$5g ^2G - 7f ^2F^{\circ}$	
5163,90	7	23,54	25,94	$5g ^2G - 7h ^2H^{\circ}$	
5150,86	6	23,54	25,94	5f ² F°—7g ² G	$^{5/2}$, $^{7/2}$ — $^{7/2}$, $^{9/2}$ $^{3/2}$, $^{5/2}$ — $^{5/2}$, $^{7/2}$ $^{5/2}$, $^{7/2}$ — $^{3/2}$, $^{5/2}$
4903,71	4	23,41	25,94	5d ² D—7f ² F°	
4701,65	6	20,78	23,41	4f ² F°—5d ² D	

λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
4529 ,176 4528 ,911	10	17,81 17,81	20,55 20,55	4p ² P°—4d ² D 4p ² P°—4d ² D	$\frac{3}{2}$ $-\frac{5}{2}$ $\frac{3}{2}$ $-\frac{3}{2}$
4512,535 4490,90 4479,968 4479,891 4364,59	8 2 4 3 2	17,80 20,78 20,78 20,78 20,78 22,12	20,55 23,54 23,54 23,54 24,96	$4p^{2}P^{\circ}-4d^{2}D$ $4f^{2}F^{\circ}-5f^{2}F^{\circ}$ $4f^{2}F^{\circ}-5g^{2}G$ $4f^{2}F^{\circ}-5g^{2}G$ $5p^{2}P^{\circ}-6d^{2}D$	$^{5}/_{2},\ ^{7}/_{2}-^{5}/_{2},\ ^{7}/_{2}-^{5}/_{2},\ ^{7}/_{2}\\ ^{7}/_{2}-^{7}/_{2},\ ^{9}/_{2}\\ ^{5}/_{2}-^{7}/_{2}\\ ^{3}/_{2}-^{3}/_{2},\ ^{5}/_{2}$
4357,2 4199,00 4188,88 4150,138 4149,917	- 0,5 0,5 8 1	22,12 — 23,54 20,55 20,55	24,96 — 26,49 23,54 23,54	$5p ^{2}P^{\circ} - 6d ^{2}D$ $ 5f ^{2}F^{\circ} - 8d ^{2}D$ $4d ^{2}D - 5f ^{2}F^{\circ}$ $4d ^{2}D - 5f ^{2}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4149,897 4142,15 4141,25 4140,21	10 2 0 2	20,55 23,54 23,54	23,54 26,53 26,42	4d ² D—5f ² F° 5f ² F°—8g ² G 5f ² F°—8h ² H°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3980,56 3713,103 3702,086 3658,3 3612,352 3601,916	2 15 10 1 15	23,41 17,81 17,80 23,54 14,37 14,37	26,50 21,15 21,15 26,92 17,80 17,81	$5d\ ^{2}D-8f\ ^{2}F^{\circ}$ $4p\ ^{2}P^{\circ}-5s\ ^{2}S$ $4p\ ^{2}P^{\circ}-5s\ ^{2}S$ $5g\ ^{2}G-9h\ ^{2}H^{\circ}$ $3d\ ^{2}D-4p\ ^{2}P^{\circ}$ $3d\ ^{2}D-4p\ ^{2}P^{\circ}$	3/2, $5/2 - 5/2$, $7/2$ $3/2 - 1/2$ $1/2 - 1/2$ $7/2$, $9/2 - 9/2$, $11/2$ $3/2 - 1/2$ $3/2 - 3/2$
3601,623 3287,37 3283,114 2961,06 2909,77	20 1 0,5 1,5 2		17,81 25,89 25,89 24,96 25,03	$3d^{2}D-4p^{2}P^{\circ}$ $5p^{2}P^{\circ}-7d^{2}D$ $5p^{2}P^{\circ}-7d^{2}D$ $4f^{2}F^{\circ}-6d^{2}D$ $4f^{2}F^{\circ}-6f^{2}F^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 , 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 , 5/2 \\ 7/2 - 5/2 , 7/2 \end{array}$
2907,05 2906,34 2762,815 2760,48 2422,44	10 3 9 1 5	20,76 20,55 20,55 20,76	25,04 25,03 25,04 25,89	$4f ^2F^{\circ} - 6g ^2G$ $ 4d ^2D - 6f ^2F^{\circ}$ $4d ^2D - 6f ^2F^{\circ}$ $4f ^2F^{\circ} - 7d ^2D$	$\begin{array}{c} {}^{5/2}-{}^{7/2}\\ {}^{-}\\ {}^{5/2}-{}^{5/2}, \ {}^{7/2}\\ {}^{3/2}-{}^{5/2}\\ {}^{5/2}-{}^{3/2}, \ {}^{5/2}\end{array}$
2400,33 2398,98 2398,76 2299,47 2298,36	3 5 5 3 0	20,76 20,76 20,76 20,80 20,55	25,94 25,94 25,94 25,94 25,94	$4f ^2F^{\circ} - 7f ^2F^{\circ}$ $4f ^2F^{\circ} - 7g ^2G$ $4f ^2F^{\circ} - 7g ^2G$ $4d ^2D - 7f ^2F^{\circ}$ $4d ^2D - 7f ^2F^{\circ}$	7/2— $5/2$, $7/2$ $7/2$ — $7/2$, $9/2$ $5/2$ — $7/2$ $3/2$ — $5/2$ $5/2$ — $7/2$
2213,56 2209,66 2154,635 1935,83 1862,749	2 1 1 10 10	17,81 17,81 20,78 14,37 0,00	23,41 23,41 26,52 20,78 6,65	$4p^{2}P^{\circ}-5d^{2}D$ $4p^{2}P^{\circ}-5d^{2}D$ $4f^{2}F^{\circ}-8g^{2}G$ $3d^{2}D-4f^{2}F^{\circ}$ $3s^{2}S-3p^{2}P^{\circ}$	$\begin{array}{c} 3/_2 - 3/_2 \; , \; 5/_2 \\ 1/_2 - 3/_2 \\ 5/_2 \; , \; 7/_2 - 7/_2 \; , \; 9/_2 \\ 3/_2 \; , \; 5/_2 - 5/_2 \; , \; 7/_2 \\ 1/_2 - 1/_2 \end{array}$
1854,715 1611,849 1605,776 1384,144 1379,670	10 8 8 5 3	0,00 6,65 6,65 6,65 6,65	6,65 14,37 14,37 15,64 15,64	$3s^{2}S - 3p^{2}P^{\circ}$ $3p^{2}P^{\circ} - 3d^{2}D$ $3p^{2}P^{\circ} - 3d^{2}D$ $3p^{2}P^{\circ} - 4s^{2}S$ $3p^{2}P^{\circ} - 4s^{2}S$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2}, & 5/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
1352,92 1162,66 893,905 892,056 856,768	1 0 5 4 5	14,37 14,37 6,65 6,65 6,65	23,54 25,04 20,55 20,55 21,15	3d ² D—5f ² F° 3d ² D—6f ² F° 3p ² P°—4d ² D 3p ² P°—4d ² D 3p ² P°—5s ² S	$\begin{array}{c} 3/2, & 5/2 - 5/2, & 7/2 \\ 3/2, & 5/2 - 5/2, & 7/2 \\ & 3/2 - 3/2, & 5/2 \\ & & 1/2 - 3/2 \\ & & 3/2 - 1/2 \end{array}$
855,040 726,948 725,716 696,212 695,817	4 3 2 4 5	6,65 6,65 6,65 0,00 0,00	21,15 23,73 23,73 17,81 17,81	$3p \ ^{2}P^{\circ}-5s \ ^{2}S$ $3p \ ^{2}P^{\circ}-6s \ ^{2}S$ $3p \ ^{2}P^{\circ}-6s \ ^{2}S$ $3p \ ^{2}P^{\circ}-6s \ ^{2}S$ $3s \ ^{2}S-4p \ ^{2}P^{\circ}$ $3s \ ^{2}S-4p \ ^{2}P^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \end{array} $

۸, À	I	E _H , eV	E _B , eV	Transition	J
671,198 670,144 560,390 511,215 486,95	2 1 7 4	6,65 6,65 0,00 0,00 0,00	25,16 25,16 22,15 24,25 25,45	$3p^{2}P^{\circ}-7s^{2}S$ $3p^{2}P^{\circ}-7s^{2}S$ $3s^{2}S-5p^{2}P^{\circ}$ $3s^{2}S-6p^{2}P^{\circ}$ $3s^{2}S-7p^{2}P^{\circ}$	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 \end{array}$

Al IV, ground state $1s^2\,2s^2\,2p^{6\,1}S_0$ Ionization potential 967783 cm⁻¹; 119,983 eV

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
1881 ,19	1	76,68	83,27	$\begin{array}{c} 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3s \ [4^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p \ [4^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p \ [4^{1}/_{2}] \\ 3s' \ [^{1}/_{2}]^{\circ} - 3p' \ [4^{1}/_{2}] \end{array}$	1—1
1818 ,55	1	76,45	83,27		2—1
1639 ,00	2	77,45	85,02		1—2
1589 ,27	1	76,86	84,66		0—1
1584 ,45	2	77,45	85,28		1—2
1582,04	3	76,68	84,51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2
1564,14	1	77,45	85,38		1-1
1557,24	5	76,45	84,41		2-3
1553,00	1	76,68	84,66		1-1
1537,52	2	76,45	84,51		2-2
1526 ,15	1	77,45	85,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0
1486 ,87	1	76,68	85,02		1-2
1481 ,46	0	76,86	85,23		0-1
1449 ,70	0	76,68	85,23		1-1
1447 ,47	2	76,45	85,02		2-2
1441,81 1431,93 1425,00 1417,58 1412,24	1 2 0 0 0	76,68 76,68 76,68 85,38 76,45	85,28 85,34 85,38 94,12 85,23	$\begin{array}{c} 3s \ [4^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p \ [^{1}/_{2}] \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [^{1}/_{2}] \\ 3p' \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3s \ [1^{1}/_{2}]^{\circ} - 3p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 1-1 \\ 1-0 \\ 2-1 \end{array} $
1409,52 1404,72 1388,77 1359,49 1353,73	0 2 2 0 0	85,38 76,45 76,45 85,23 85,02	94,47 85,28 85,38 94,35 94,17	$3p'$ [$^{1}/_{2}$] $-3d$ [$^{1}/_{2}$] $^{\circ}$ $3s$ [$^{1}/_{2}$] $^{\circ}$ $-3p'$ [$^{1}/_{2}$] $3s$ [$^{1}/_{2}$] $^{\circ}$ $-3p'$ [$^{1}/_{2}$] $3p'$ [$^{1}/_{2}$] $-3d$ [$^{1}/_{2}$] $^{\circ}$ $3p$ [$^{1}/_{2}$] $-3d$ [$^{1}/_{2}$] $^{\circ}$	1-1 $2-2$ $2-1$ $1-2$ $2-1$
1302,13	2	85,57	95,10	$3p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1^1/2 \end{bmatrix}^{\circ}$	0-1
1283,48	0	84,51	94,17	$3p \begin{bmatrix} 2^1/2 \end{bmatrix} - 3d \begin{bmatrix} 1/2 \end{bmatrix}^{\circ}$	2-1
1272,70	3	85,02	94,76	$3p \begin{bmatrix} 1^1/2 \end{bmatrix} - 3d \begin{bmatrix} 2^1/2 \end{bmatrix}^{\circ}$	2-3
1264,14	3	85,38	95,18	$3p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d' \begin{bmatrix} 1^1/2 \end{bmatrix}^{\circ}$	1-2
1262,51	1	85,28	95,10	$3p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1^1/2 \end{bmatrix}^{\circ}$	2-1
1257,58	3	85,28	95,13	$3p' [1^{1}/_{2}] - 3d' [2^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 1 - 2 \\ 2 - 3 \\ 1 - 2 \end{array} $
1251,35	1	85,28	95,18	$3p' [1^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ}$	
1248,76	2	85,23	95,16	$3p' [1^{1}/_{2}] - 3d' [2^{1}/_{2}]^{\circ}$	
1240,83	3	84,51	94,50	$3p [2^{1}/_{2}] - 3d [3^{1}/_{2}]^{\circ}$	
1240,18	2	84,66	94,65	$3p [1^{1}/_{2}] - 3d [2^{1}/_{2}]^{\circ}$	
1237,14 1229,94 1228,30 1219,19 1216,78	4 0 1 0 1	84,41 85,02 84,41 85,02 85,38	94,43 95,10 94,50 95,18 95,57	$3p \ [2^{1}/_{2}] - 3d \ [3^{1}/_{2}]^{\circ}$ $3p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ}$ $3p \ [2^{1}/_{2}] - 3d \ [3^{1}/_{2}]^{\circ}$ $3p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ}$ $3p' \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 3-4 \\ 2-1 \\ 3-3 \\ 2-2 \\ 1-1 \end{array} $
1211,80	0	85,34	95,57	$3p [1/2] - 3d' [11/2]^{\circ}$	0—1
1198,47	1	84,41	94,76	$3p [21/2] - 3d [21/2]^{\circ}$	3—3
1167,35	0	84,51	95,13	$3p [21/2] - 3d' [21/2]^{\circ}$	2—3

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
1161,85	0	84,51	95,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2
1156,21	1	84,41	95,13		3—3
1150,85 1142,03 1136,80 1118,80 161,686	0 1 3 4 14	84,41 83,27 83,27 83,27 0,00	95,18 94,12 94,17 94,35 76,68	$\begin{array}{c} 3p \ [2^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3p \ [^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 2p^{6} \ ^{1}S - 3s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 3-2 \\ 1-0 \\ 1-1 \\ 1-2 \\ 0-1 \end{array} $
160,073	16	00,00	77,45	$\begin{array}{c} 2p^{6} {}^{1}S - 3s' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 3d' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4s \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1
131,652	3	0,00	94,17		0-1
130,403	11	0,00	95,10		0-1
129,729	12	0,00	95,57		0-1
124,543	6	0,00	99,55		0-1
124,034	8	00,00	99,55	$\begin{array}{c} 2p^{6} {}^{1}S - 4s' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 4d' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5s \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1
117,377	0	0,00	105,62		0-1
116,920	5	0,00	106,04		0-1
116,459	7	0,00	106,46		0-1
114,759	0	00,00	108,03		0-1
114,329	0	0,00	108,44	$\begin{array}{c} 2p^{6} {}^{1}S - 5s' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 5d' \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 6d \left[{}^{1}/_{2} \right]^{\circ} \\ 2p^{6} {}^{1}S - 6d' \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1
111,780	0	0,00	110,91		0-1
111,590	1	0,00	111,10		0-1
111,200	1	0,00	111,50		0-1
108,907	0	0,00	113,84		0-1
108,535	0	0,00	114,23		0-1

Al V, ground state $1s^2 \ 2s^2 \ 2p^{5-2}P_{3/2}^0$ Ionization potential 1 240 600 cm $^{-1}$; 153,806 eV

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
281,397 278,699 136,668 133,242	14 16 8 2	0,42 0,00 44,48 0,42 ,0,00	44,48 44,48 136,79 93,47 93,21	$2p^{5} {}^{2}P^{\circ} - 2p^{6} {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 2p^{6} {}^{2}S$ $2p^{6} {}^{2}S - 3s''' {}^{2}P^{\circ}$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{4}P$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
133,013 132,630 131,441 131,003	4 10 20 20	0,42 $0,00$ $0,42$ $0,42$	93,63 93,47 94,75 95,06	$2p^{5} \ ^{2}P^{\circ} _ 3s \ ^{4}P$ $2p^{5} \ ^{2}P^{\circ} _ 3s \ ^{4}P$ $2p^{5} \ ^{2}P^{\circ} _ 3s \ ^{2}P$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
130,848 130,413 126,065 125,525 118,984	20 20 15 15 6	0,00 0,00 0,42 0,00 0,42	94,75 95,06 98,77 98,77 104,62	$2p^{5} 2P^{\circ} - 3s^{2}P$ $2p^{5} 2P^{\circ} - 3s'^{2}D$ $2p^{5} 2P^{\circ} - 3s'^{2}D$ $2p^{5} 2P^{\circ} - 3s''^{2}S$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2, 3/2 \\ 1/2 - 1/2 \end{array} $
118,500 109,021 108,851 108,707 108,616	10 3 1 6 1	0,00 0,42 0,42 0,00 0,00	104,62 114,14 114,32 114,04 114,14	$2p^{5} \cdot 2P^{\circ} - 3s'' \cdot 2S$ $2p^{5} \cdot 2P^{\circ} - 3d \cdot 4D$ $2p^{5} \cdot 2P^{\circ} - 3d \cdot 4P$ $2p^{5} \cdot 2P^{\circ} - 3d \cdot 4D$ $2p^{5} \cdot 2P^{\circ} - 3d \cdot 4D$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $ $ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
108,462 108,446 108,404 108,385	10 3 5 10	$0,42 \\ 0,00 \\ 0,42 \\ 0,00$	114,73 114,32 114,79 114,39	$2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{4}P$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{4}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
108,315 108,112 108,057	$\begin{array}{c} 4\\12\\12\end{array}$	0,00 0,42 0,00	114,46 115,10 114,73	$2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}F$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d \ ^{2}D$	3/2 - 5/2 $1/2 - 3/2$ $3/2 - 3/2$

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
108,004 107,945 107,711 104,495 104,447	5 20 6 8 10	0,00 0,00 0,00 0,42 0,42	114,79 114,85 115,10 119,07 119,12	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$	3/2 - 1/2 $3/2 - 5/2$ $3/2 - 3/2$ $1/2 - 1/2$ $1/2 - 1/2$
104,363 104,180 104,121 104,073 103,990	10 14 3 10 4	0,42 0,42 0,00 0,00 0,00	119,22 119,43 119,07 119,12 119,22	$2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
103,881 103,805 99,769 99,616 99,544	14 10 0,5 7 2	0,00 0,00 0,42 0,42 0,42	119,35 119,43 124,69 124,88 124,97	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2 - 5/2 $3/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$
99,427 99,290 99,200 99,150 95,835	$egin{matrix} 4 \\ 10 \\ 1 \\ 1 \\ 2 \end{bmatrix}$	0,00 0,00 0,00 0,42 0,00	124,69 124,86 124,97 129,37 129,36	$2p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$	3/2 - 3/2 $3/2 - 3/2$, $5/2$ $3/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$, $5/2$
94,187 94,160 94,117 93,981 93,955	2 2 2,5 2 6	0,42 0,42 0,00 0,00 0,42	132,06 132,09 131,73 131,92 132,38	$2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$	1/2 - 1/2 $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $1/2 - 3/2$
93,855 93,755 91,750 90,982 90,914	4 7 1 1 4	0,00 0,00 0,42 0,42 0,42	132,09 132,24 135,13 136,69 136,79	$2p^{5} {}^{2}P^{\circ}-4d {}^{2}D \ 2p^{5} {}^{2}P^{\circ}-4d {}^{2}D \ 2p^{5} {}^{2}P^{\circ}-4s'' {}^{2}S \ 2p^{5} {}^{2}P^{\circ}-4d' {}^{2}S \ 2p {}^{2}P^{\circ}-4d' {}^{2}P$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$
90,701 90,646 90,630 88,817	4 2 5 1	0,00 0,00 0,00 0,42	136,69 136,77 136,79 140,01	$2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $\{ 2p^{5} {}^{2}P^{\circ} - 5d {}^{2}P$ $\{ 2p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$	$ \frac{3}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{3}{2} $
88,688	4	0,42	140,01	$2p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$	$^{3}/_{2}^{-}$ _ $^{5}/_{2}$
88,636 88,539 88,425 87,279 87,020	2 8 2 1 2	0,42 0,00 0,00 0,42 0,00	140,30 140,01 140,21 142,48 142,47	$2p^{5} {}^{2}P^{\circ} - 5d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d'' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d'' {}^{2}D$	$^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{5}/_{2}$
85,865 85,804 85,662	2 7 1	0,42 $0,00$	144,81 — 144,73	$2p^{5} {}^{2}P^{\circ} - 5d' {}^{2}P - 5d' {}^{2}P - 5d' {}^{2}S$	$\frac{1}{2}$ _{2}_{3/2}_{2}_{3/2}_{1}_{2}_{1/2}

Al VI, ground state $1s^2$ $2s^2$ $2p^4$ 3P_2 Ionization potential $1536\,300$ cm $^{-1}$; 190,466 eV

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
312,241 310,908	6	$0,34 \\ 0,47$	40,04 40,35	$2p^4 \ ^3P - 2p^5 \ ^3P^9 \ 2p^4 \ ^3P - 2p^5 \ ^3P^0$	1—2 0—1
309,852 309,596	6 8	$0,34 \\ 0,00$	40,35 40,04	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1 \\ 1 \\ -1 \\ 2 \\ \end{array} $
308,560	6	0,34	40,52	$2p^4 \ ^{1}_{3}P - 2p^5 \ ^{1}_{3}P^{\circ}$	1-0

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
307,248 275,350 243,760 113,756 113,623	7 6 12 1	0,00 10,99 5,16 40,35 40,35	40,35 56,02 56,02 149,34 149,45	$2p^4 {}^3P - 2p^5 {}^3P^\circ \ 2p^4 {}^1S - 2p^5 {}^1P^\circ \ 2p^4 {}^1D - 2p^5 {}^1P^\circ \ 2p^5 {}^3P^\circ - 3s''' {}^3P \ 2p^5 {}^3P^\circ - 3s''' {}^3P$	2-1 0-1 2-1 1-2 1-1
113,437 113,314 109,974 109,843 109,514	3 1 4 12 20	40,04 40,04 0,47 0,34 0,00	149,34 149,45 113,21 113,21 113,21	$2p^{5} \ ^{3}P^{\circ} - ^{3}s''' \ ^{3}P$ $2p^{5} \ ^{3}P^{\circ} - ^{3}s''' \ ^{3}P$ $2p^{4} \ ^{3}P - ^{3}s \ ^{3}S^{\circ}$ $2p^{4} \ ^{3}P - ^{3}s \ ^{3}S^{\circ}$ $2p^{4} \ ^{3}P - ^{3}s \ ^{3}S^{\circ}$	2—2 2—1 0—1 1—1 2—1
109,284 107,620 104,466 104,344 104,047	$7 \\ 14 \\ 8 \\ 16 \\ 20$	10,99 5,16 0,47 0,34 0,00	124,43 120,35 119,15 119,15 119,15	$\begin{array}{c} 2p^{4} {}^{1}S - 3s'' {}^{1}P^{\circ} \\ 2p^{4} {}^{1}D - 3s' {}^{1}D^{\circ} \\ 2p^{4} {}^{3}P - 3s' {}^{3}D \\ 2p^{4} {}^{3}P - 3s' {}^{3}D^{\circ} \\ 2p^{4} {}^{3}P - 3s' {}^{3}D^{\circ} \end{array}$	0-1 $2-2$ $0-1$ $1-1$, 2 $2-1$, 2, 3
103,940 101,027 100,919 100,894 100,639	6 3 4 4 2	5,16 0,47 0,34 0,34 0,00	124,43 123,19 123,19 123,21 123,19	$2p^{4} ^{1}D - 3s'' ^{1}P^{\circ}$ $2p^{4} ^{3}P - 3s'' ^{3}P^{\circ}$	2-1 0-1 1-0, 1, 2 1-2 2-1
100,616 96,673 95,436 92,970 92,875	12 1 2 5 10	0,00 40,35 10,99 0,47 0,34	123,21 168,60 140,90 133,83 133,83	$2p^4 \ ^3P - ^3s'' \ ^3P^\circ \ 2p^5 \ ^3P^\circ - ^3s^V \ ^3S \ 2p^4 \ ^1S - ^3d' \ ^1P^\circ \ 2p^4 \ ^3P - ^3d \ ^3D^\circ \ 2p^4 \ ^3P - ^3d \ ^3D^\circ \ $	$ \begin{array}{c} 2-2 \\ 1-1 \\ 0-1 \\ 0-1 \\ 1-1, 2 \end{array} $
92,636 92,626 91,332 90,858 90,200	4 15 10 12 20	0,00 0,00 5,16 5,16 5,16	133,83 133,85 140,90 141,61 142,60	$2p^{4} ^{3}P - 3d ^{3}D^{\circ}$ $2p^{4} ^{3}P - 3d ^{3}D^{\circ}$ $2p^{4} ^{1}D - 3d' ^{1}P^{\circ}$ $2p^{4} ^{1}D - 3d' ^{1}F^{\circ}$ $2p^{4} ^{1}D - 3d' ^{1}F^{\circ}$	2-2 2-3 2-1 2-2 2-3
88,688 88,539 88,469 88,376 88,325	4 8 5 15 2	5,16 5,16 0,47 0,34 0,00	144,95 145,18 140,61 140,61 140,36	$\begin{array}{c} 2p^{4} \ ^{1}D - 3d'' \ ^{1}D^{\circ} \\ 2p^{4} \ ^{1}D - 3d'' \ ^{1}P^{\circ} \\ 2p^{4} \ ^{3}P - 3d' \ ^{3}D^{\circ} \\ 2p^{4} \ ^{3}P - 3d' \ ^{3}F^{\circ} \\ 2p^{4} \ ^{3}P - 3d' \ ^{3}F^{\circ} \end{array}$	2—2 2—1 0—1 1—1, 2 2—3
88,273 88,170 87,887 87,866 87,802	15 20 5 7 5	5,16 0,00 0,47 0,34 0,34	145,61 140,61 140,61 141,44 141,54	$2p^{4} {}^{3}D - 3d'' {}^{1}F^{\circ}$ $2p^{4} {}^{3}P - 3d' {}^{3}D^{\circ}$ $2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ}$ $2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ}$ $2p^{4} {}^{3}P - 3d' {}^{3}P^{\circ}$	2-3 2-1, 2, 3 0-1 1-2 1-1
87,783 87,655 87,629 87,592 87,544	5 13 2 10 7	0,34 0,00 0,47 0,00 0,34	141,57 141,44 141,96 141,54 141,96	$2p^4 \ ^3P - 3d' \ ^3P^\circ$ $2p^4 \ ^3P - 3d' \ ^3P^\circ$ $2p^4 \ ^3P - 3d' \ ^3S^\circ$ $2p^4 \ ^3P - 3d' \ ^3S^\circ$ $2p^4 \ ^3P - 3d' \ ^3S^\circ$	$ \begin{array}{r} 1 - 0 \\ 2 - 2 \\ 0 - 1 \\ 2 - 1 \\ 1 - 1 \end{array} $
87,334 86,147 86,097 86,020 85,817	3	0,00 0,47 0,34 0,34 0,00	141,96 144,37 144,34 144,47 144,47	$2p^4 \ ^3P - 3d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 3d'' \ ^3P^{\circ}$ $2p^4 \ ^3P - 3d'' \ ^3P^{\circ}$ $2p^4 \ ^3P - 3d'' \ ^3P^{\circ}$ $2p^4 \ ^3P - 3d'' \ ^3P^{\circ}$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 1-0 \\ 1-2 \\ 2-2 \end{array} $
85,764 85,724 85,622 85,569 85,515	$\begin{array}{c} 6 \\ 6 \\ 4 \end{array}$	0,34 0,00 0,34 0,00 0,00	144,89 144,62 145,13 144,89 144,98	$2p^4$ 3P — $3d''$ $^3F^\circ$ $2p^4$ 3P — $3d''$ $^3F^\circ$ $2p^4$ 3P — $3d''$ $^3D^\circ$ $2p^4$ 3P — $3d''$ $^3F^\circ$ $2p^4$ 3P — $3d''$ $^3D^\circ$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-2 \\ 2-2 \\ 2-3 \end{array} $
85,423 82,267 82,082	2	0,00 0,34 0,00	145,13 151,04 151,04	$2p^4 \ ^3P - 3d'' \ ^3D^{\circ} \ 2p^4 \ ^3P - 4s \ ^3S^{\circ} \ 2p^4 \ ^3P - 4s \ ^3S^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 2-1 \end{array} $

λ, Å	I	$E_{ m H}^{}$, eV	$E_{\mathrm{B}},\;eV$	Transition	J
81,738 80,770	1 1,5	10,99 5,16	162,67 158,65	$2p^{4} {}^{1}S - 4s'' {}^{1}P^{\circ} \\ 2p^{4} {}^{1}D - 4s' {}^{1}D^{\circ}$	$0-1 \\ 2-2$
78,459 78,178 78,112 77,945 76,953 76,697	1,5 1 2 10 1 4	0,00 0,47 0,34 0,00 5,16 5,16	158,02 159,06 159,06 159,06 166,26 166,80	$2p^4 \ ^3P - 4s' \ ^3D^\circ$ $2p^4 \ ^3P - 4d \ ^3D^\circ$ $2p^4 \ ^3P - 4d \ ^3D^\circ$ $2p^4 \ ^3P - 4d \ ^3D^\circ$ $2p^4 \ ^1D - 4d' \ ^1P^\circ$ $2p^4 \ ^1D - 4d' \ ^1D^\circ$	2-1, 2, 3 0-1 1-1, 2 2-1, 2, 3 2-1 2-2
76,618 74,892 74,813 74,656 74,592	4 2 1 5 3	5,16 5,16 0,34 0,00 0,34	166,97 170,70 166,06 166,06 166,54	$2p^4 \ 1D - 4d' \ 1F^{\circ}$ $2p^4 \ 1D - 4d'' \ 1F^{\circ}$ $2p^4 \ 3P - 4d' \ 3D^{\circ}$ $2p^4 \ 3P - 4d' \ 3P^{\circ}$ $2p^4 \ 3P - 4d' \ 3P^{\circ}$	2-3 2-3 1-1, 2 2-1, 2, 3 1-2
74,504 74,444 74,346 73,076 72,926	1 6 1 2 2	0,34 0,00 0,00 0,34 0,00	166,75 166,54 166,75 170,00 170,00	$2p^4 \ ^3P - 4d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 4d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 4d' \ ^3S^{\circ}$ $2p^4 \ ^3P - 4d'' \ ^3P^{\circ}$ $2p^4 \ ^3P - 4d'' \ ^3P^{\circ}$	$ \begin{array}{r} 1 \\ 2-2 \\ 2-1 \\ 1-2 \\ 2-2 \end{array} $
72,865 72,810 68,293 68,167	1 5 0 1	0,34 0,00 0,00 0,00	170,49 170,28 181,72 181,87	$2p^4 \ ^3P - 4d'' \ ^3D^{\circ} \ 2p^4 \ ^3P - 4d'' \ ^3P^{\circ} \ 2p^4 \ ^3P - 5d'' \ ^3P^{\circ} \ 2p^4 \ ^3P - 5d'' \ ^3D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-2 \\ 2-3 \end{array} $

Unclassified Lines of Aluminum

λ, Å		Presumed classification	λ, Å	Ι	Presumed classification
977,4	4		78,508	3	
904,5	$\bar{5}$	_	78,938	$\bar{6}$	_
718,9	3		76,853	- <u>'</u> E	_
678,0	5	_	76,794	4	_
95,720	4		72,674	6	_
94,970	3		69,631	4	_
91,023	10		69,165	4	

SILICON, Z = 14

Si I, ground state $1s^2 2s^2 2p^6 3s^2 3p^2 ^3 P_0$ Ionization potential 65747,5 cm⁻¹; 8,151 eV

	- 				
λ, Å	I	E _H , eV	E _B , eV	Transition	J
25854,38	6	5,62	6,10	3p ³ 3D°—4p 3P	3-2
22062,71	12	6,73	7,29	3d 3D°—4f 3F	3-4
21879,35	8	6,72	7,29	3d 3D°—4f 1F	2-3
21819,69	5	6,72	7,29	3d 3D°—4f 3F	2-3
21779,77	9	6,72	7,29	3d 3D°—4f 3F	1-2
21354,24	21	6,22	6,80	$4p ^{1}D - 5s ^{1}P^{\circ}$	2-1
20917,13	12	6,73	7,32	$3d ^{3}D^{\circ} - 4f ^{3}G$	3-4
19928,88	31	6,10	6,72	$4p ^{3}P - 3d ^{3}D^{\circ}$	2-2
19722,50	110	6,10	6,73	$4p ^{3}P - 3d ^{3}D^{\circ}$	2-3
19508,13	14	6,08	6,72	$4p ^{3}P - 3d ^{3}D^{\circ}$	1-1
19506,12	5	6,10	6,73	$4p\ ^3P - 5s\ ^3P^\circ \ 4p\ ^3P - 3d\ ^3D^\circ \ 4p\ ^3P - 3d\ ^3D^\circ \ 4p\ ^3P - 3d\ ^3D^\circ \ 4p\ ^3P - 5s\ ^3P^\circ$	2-1
19493,38	13	6,08	6,72		1-1
19432,97	48	6,08	6,72		1-2
19385,94	15	6,08	6,72		0-1
19283,29	8	6,08	6,73		1-0
19030,79	5	6,08	6,73	$4p\ ^3P - 5s\ ^3P^\circ \ 4p\ ^3P - 5s\ ^3P^\circ \ 4p\ ^3P - 5s\ ^3P^\circ \ 3d\ ^1F^\circ - 4f\ ^3F \ 3d\ ^1F^\circ - 4f\ ^3G$	1-1
18914,48	8	6,08	6,73		0-1
18722,90	26	6,10	6,76		2-2
18422,72	7	6,62	7,29		3-4
17617,00	9	6,62	7,32		3-4
17327,29	28	6,62	7,33	$3d {}^{1}F^{\circ}-4f {}^{3}/_{2} [{}^{9}/_{2}] \ 4p {}^{3}D-3d {}^{3}D^{\circ} \ 4p {}^{3}D-3d {}^{3}D^{\circ} \ 4p {}^{1}P-3d {}^{1}P^{\circ} \ 4p {}^{3}D-3d {}^{3}D^{\circ}$	3-4
16680,77	29	5,98	6,73		3-3
16381,55	16	5,96	6,72		2-2
16380,12	8	5,86	6,62		1-1
16241,84	7	5,96	6,73		2-3
16215,68 16163,71 16094,80 16060,03 15960,04	11 60 20 95 40	5,95 5,95 5,96 5,95 5,98	6,72 6,72 6,73 6,73 6,76	$4p\ ^3D - 3d\ ^3D^\circ \ 4p\ ^3D - 3d\ ^3D^\circ \ 4p\ ^3D - 5s\ ^3P^\circ \ 4p\ ^3D - 5s\ ^3P^\circ \ 4p\ ^3D - 5s\ ^3P^\circ \ $	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 2 - 1 \\ 1 - 0 \\ 3 - 2 \end{array} $
15888,39 15884,41 15833,58 15557,81 14224,54	190 5 7 7 6	5,08 5,95 6,22 5,96 5,08	5,86 6,73 7,01 6,76 5,95	$4s ^{1}P^{\circ} - 4p ^{1}P$ $4p ^{3}D - 5s ^{3}P^{\circ}$ $4p ^{1}D - 4d ^{1}D^{\circ}$ $4p ^{3}D - 5s ^{3}P^{\circ}$ $4s ^{1}P^{\circ} - 4p ^{3}D$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 2 - 2 \\ 2 - 2 \\ 1 - 1 \end{array} $
13711,36 13693,85 13309,04 13287,58 13176,90	5 8 5 9 11	6,12 6,12 6,10 4,93 5,86	7,03 7,03 7,03 5,86 6,80	$4p\ ^3S - 3p^3\ ^3P^\circ \ 4p\ ^3S - 3p^3\ ^3P^\circ \ 4p\ ^3P - 3p^3\ ^3P^\circ \ 4s\ ^3P - 4p\ ^1P^\circ \ 4p\ ^1P - 5s\ ^1P^\circ \ $	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-1 \\ 1-1 \\ 1-1 \end{array} $
12395,82 12270,68 12103,50 12031,48 11991,52	6 120 5 10 5	4,95 4,95 4,93 4,95 4,92	5,95 5,96 5,95 5,98 5,95	$4s ^{3}P^{\circ} - 4p ^{3}D$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-1 \\ 2-3 \\ 0-1 \end{array} $
11984 ,18	10	4,93	5,96	4s ³ P°-4p ³ D	1—2
11289 ,83	15	6,19	7,29	3d ³ F°-4f ³ F	3—4
11187 ,588	16	6,18	7,29	3d ³ F°-4f ³ G	2—3
11130 ,03	12	6,21	7,32	3d ³ F°-4f ³ G	4—4
11017 ,9648	8	6,21	7,33	3d ³ F°-4f ³ / ₂ [⁹ / ₂]	4—5
10984,527	20	6,19	7,32	3d ³ F°—4f ³ G	3-3
10982,061	30	6,19	7,32	3d ³ F°—4f ³ G	3-4
10979,308	80	4,95	6,08	4s ³ P°—4p ³ P	2-1

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
10885,336	30	6 ,18	7,32	3d ³ F°—4f ³ G	2—3
10882,802	30	5 ,98	7,12	4p ³ D—4d ³ F°	3—3
10869,5408	130	5,08	6,22	$4s ^{1}P^{\circ} - 4p ^{1}D$ $3d ^{3}F^{\circ} - 4f ^{3}/_{2} [^{9}/_{2}]$ $4p ^{1}P - 4d ^{1}D^{\circ}$ $4s ^{3}P^{\circ} - 4p ^{3}P$ $3d ^{3}F^{\circ} - 4f ^{1}D$	1-2
10868,79	30	6,19	7,33		3-4
10843,854	60	5,86	7,00		1-2
10827,091	140	4,95	6,10		2-2
10796,06	7	6,18	7,33		2-2
10786,8560	80	4,93	6,08	$4s\ ^{3}P^{\circ}$ — $4p\ ^{3}P$	1-0
10784,5597	30	5,96	7,11	$4p\ ^{3}D$ — $4d\ ^{3}F^{\circ}$	2-2
10749,3837	60	4,93	6,08	$4s\ ^{3}P^{\circ}$ — $4p\ ^{3}P$	1-1
10727,4076	30	5,98	7,14	$4p\ ^{3}D$ — $4d\ ^{3}F^{\circ}$	3-4
10694,2510	30	5,96	7,12	$4p\ ^{3}D$ — $4d\ ^{3}F^{\circ}$	2-3
10689,719	25	5,95	7,11	4p 3D—4d 2F°	$ \begin{array}{r} 1-2 \\ 0-1 \\ 1-2 \\ 1-2 \\ 2-1 \end{array} $
10660,9748	120	4,92	6,08	4s 3P°—4p 3P	
10627,6467	20	5,86	7,03	4p 1P—4d 3P°	
10603,431	120	4,93	6,10	4s 3P°—4p 3P	
10585,1412	120	4,95	6,12	4s 3P°—4p 3S	
10371,269	30	4,93	6,12	$4s ^3P^{\circ} - 4p ^3S$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 2 - 2 \\ 2 - 2 \end{array} $
10288,942	10	4,92	6,12	$4s ^3P^{\circ} - 4p ^3S$	
9891,72	10	6,12	7,38	$4p ^3S - 6s ^3P^{\circ}$	
9887,06	10	6,22	7,48	$4p ^1D - 5d ^1D^{\circ}$	
9689,39	10	6,10	7,38	$4p ^3P - 6s ^3P^{\circ}$	
9585,92	10	4,93	6,22	$4s ^3P^{\circ} - 4p ^1D$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
9570,65	8	6,08	7,38	$4p ^3P - 6s ^3P^{\circ}$	
9505,19	20	6,12	7,43	$4p ^3S - 5d ^3P^{\circ}$	
9421,78	15	6,12	7,44	$4p ^3S - 5d ^3P^{\circ}$	
9413,506	100	5,08	6,40	$4s ^1P^{\circ} - 4p ^1S$	
9387,33 9318,22 9253,67 9208,35 9021,58	10 10 15 15 10	6,21 6,10 6,26 6,08 6,27	7,53 7,43 7,60 7,43 7,64	$3d\ ^{3}F^{\circ}-6p\ [^{3}/_{2},\ ^{3}/_{2}]$ $4p\ ^{3}P-5d\ ^{3}P^{\circ}$ $3d\ ^{3}P^{\circ}-5f\ ^{1}D$ $4p\ ^{3}P-5d\ ^{3}P^{\circ}$ $3d\ ^{3}P^{\circ}-5f\ ^{3}/_{2}\ [^{3}/_{2}]$	$ \begin{array}{r} 4 - 3 \\ 2 - 2 \\ 2 - 2 \\ 1 - 2 \\ 1 - 2 \end{array} $
9008,51	15	6,26	7,64	3d ³ P°-5f ³ D	$ \begin{array}{r} 2 - 3 \\ 2 - 1 \\ 1 - 0 \\ 3 - 2 \\ 3 - 4 \end{array} $
8949,10	10	5,96	7,35	4p ³ D-6s ³ P°	
8925,30	10	5,95	7,34	4p ³ D-6s ³ P°	
8892,7277	20	5,98	7,38	4p ³ D-6s ³ P°	
8790,3889	35	6,19	7,60	3d ³ F°-5f ³ F	
8780 ,747	11	6,22	7,63	4p ¹ D-5d ³ D°	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 2 - 3 \\ 2 - 2 \\ 2 - 3 \end{array} $
8766 ,422	14	5,96	7,38	4p ³ D-6s ³ P°	
8752 ,009	100	5,87	7,29	3d ¹ D°-4f ¹ F	
8751 ,174	10	5,87	7,29	3d ¹ D°-4f ³ F	
8742 ,4509	75	5,87	7,29	3d ¹ D°-4f ³ F	
8728,0110 8680,079 8648,4622 8647,114 8606,014	40 11 50 15 8	6,18 5,86 6,21 	7,60 7,29 7,64 — 7,50	$\begin{array}{c} 3d\ ^{3}F^{\circ}-5f\ ^{3}F\\ 4p\ ^{1}P-4d\ ^{1}P^{\circ}\\ 3d\ ^{3}F^{\circ}-5f\ ^{1}/_{2}\ [^{7}/_{2}]\\ -\\ 3d\ ^{3}F^{\circ}-6p\ [^{1}/_{2},\ ^{3}/_{2}] \end{array}$	$ \begin{array}{c} 2 - 3 \\ 1 - 1 \\ 4 - 3 \\ - \\ 3 - 2 \end{array} $
8597,0470	20	6,19	7,63	3d ³ F°—5f ³ G	3-3
8595,962	25	6,19	7,63	3d ³ F°—5f ³ G	3-4
8556,7803	120	5,87	7,32	3d ¹ D°—4f ³ G	2-3
8536,1645	40	6,18	7,63	3d ³ F°—5f ³ G	2-3
8502,2207	60	5,87	7,33	3d ¹ D°—4f ³ D	2-3
8501,547	40	5,87	7,33	$3d ^{1}D^{\circ}$ $-4f ^{1}D$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 2-2 \\ 1-0 \\ 1-1 \end{array} $
8492,078	15	5,86	7,32	$4p ^{1}P$ $-4d ^{3}D^{\circ}$	
8443,982	40	5,87	7,34	$3d ^{1}D^{\circ}$ $-4f ^{3}D$	
8435,24	8	4,93	6,40	$4s ^{3}P^{\circ}$ $-4p ^{1}S$	
8338,328	20	5,86	7,35	$4p ^{1}P$ $-6s ^{3}P^{\circ}$	
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λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}}$, eV	Transition	J
8317,39	15	5,61	7,10	$3p^3 \ ^3D^{\circ} - 5p \ ^3P$	1-0
8306,710	25	5,62	7,10	$3p^3 \ ^3D^{\circ} - 5p \ ^3P$	2-1
8294,675	13	5,61	7,10	$3p^3 \ ^3D^{\circ} - 5p \ ^3P$	1-1
8230,642	35	5,62	7,12	$3p^3 \ ^3D^{\circ} - 5p \ ^3P$	3-2
8215,15	10	6,26	7,77	$3d \ ^3P^{\circ} - 6f \ ^{1}/_{2} \ [^{5}/_{2}]$	2-3
8171,288	25	6,10	7,62	$\begin{array}{c} 4p\ ^{3}P - 5d\ ^{1}F^{\circ} \\ 3p^{3}\ ^{3}D^{\circ} - 5p\ ^{3}S \\ 4p\ ^{3}P - 5d\ ^{3}D^{\circ} \\ 4p\ ^{3}D - 5d\ ^{1}D^{\circ} \\ 4p\ ^{1}P - 6s\ ^{1}P^{\circ} \end{array}$	2—3
8162,170	15	5,62	7,13		2—1
8154,872	15	6,10	7,62		2—2
8140,55	15	5,95	7,48		1—2
8093,241	70	5,86	7,39		1—1
8071,285	25	6,10	7,63	$4p \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4p \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4p \ ^{3}D - 5d \ ^{3}F^{\circ}$ $4p \ ^{3}S - 7s \ ^{1}P^{\circ}$ $3d \ ^{3}D^{\circ} - 5p \ ^{1}D$	2—3
8070,598	25	6,08	7,62		1—2
8035,619	35	5,98	7,53		3—3
8026,950	25	6,12	7,67		1—1
7975,579	13	6,12	7,67		2—2
7970,306	35	5,96	7,52	$4p \ ^{3}D - 5d \ ^{3}F^{\circ}$ $4p \ ^{3}D - 5d \ ^{3}F^{\circ}$ $4p \ ^{3}D - 5d \ ^{3}F^{\circ}$ $4p \ ^{1}D - 6d \ ^{1}F^{\circ}$ $4p \ ^{3}D - 5d \ ^{3}F^{\circ}$	2—2
7944,0011	140	5,98	7,54		3—4
7932,3490	120	5,96	7,53		2—3
7925,850	15	6,22	7,79		2—3
7918,3857	90	5,95	7,52		1—2
7913,432	25	5,86	7,43	$\begin{array}{c} 4p\ ^{1}P-5d\ ^{3}P^{\circ} \\ 4p\ ^{3}P-7s\ ^{3}P^{\circ} \\ 3d\ ^{3}F^{\circ}-6f\ ^{1}/_{2}\ [^{7}/_{2}] \\ 3d\ ^{3}F^{\circ}-6f\ ^{3}/_{2}\ [^{9}/_{2}] \end{array}$	1—2
7912,383	20	6,10	7,66		2—2
7849,967	30	6,19	7,77		3—4
7800,008	30	6,18	7,77		2—3
7742,71	40	6,21	7,81		4—5
7680,2668	100	5,86	7,48	$4p ^{1}P - 5d ^{1}D^{\circ}$ $3d ^{3}F^{\circ} - 6f ^{3}/_{2} [^{7}/_{2}]$ $4p ^{1}P - 5d ^{3}F^{\circ}$ $4p ^{3}D - 5d ^{3}D^{\circ}$ $3p ^{3} ^{3}D^{\circ} - 4f ^{3}F$	1-2
7640,31	20	6,18	7,80		2-3
7482,19	25	5,86	7,52		1-2
7455,36	25	5,96	7,63		2-1
7424,60	85	5,62	7,29		3-3
7423,4969	$425 \\ 275 \\ 40 \\ 200 \\ 375$	5,62	7,29	$3p^3 \ ^3D^{\circ} - 4f \ ^3F$	3-4
7415,9462		5,62	7,29	$3p^3 \ ^3D^{\circ} - 4f \ ^1F$	2-3
7415,35		5,62	7,29	$3p^3 \ ^3D^{\circ} - 4f \ ^3F$	2-2
7409,0818		5,62	7,29	$3p^3 \ ^3D^{\circ} - 4f \ ^3F$	2-3
7405,774		5,61	7,29	$3p^3 \ ^3D^{\circ} - 4f \ ^3F$	1-2
7395,52	15	5,95	7,63	$\begin{array}{c} 4p\ ^{3}D - 7s\ ^{3}P^{\circ} \\ 4p\ ^{3}D - 7s\ ^{3}P^{\circ} \\ 3p^{3}\ ^{3}D^{\circ} - 4f\ ^{3}G \\ 3p^{3}\ ^{3}D^{\circ} - 4f\ ^{3}G \\ 3d\ ^{3}F^{\circ} - 7f\ ^{3}/_{2}\ \left[^{9}/_{2}\right] \end{array}$	1-0
7373,00	35	5,98	7,66		3-2
7290,26	55	5,62	7,32		3-3
7289,1730	400	5,62	7,32		3-4
7282,81	40	6,21	7,91		4-5
7275, 294	160	5,62	7,32	$3p^3 ^3D^{\circ} - 4f ^3G$	2-3
7250, 625	180	5,62	7,33	$3p^3 ^3D^{\circ} - 4f ^3D$	3-3
7250, 14	25	5,62	7,33	$3p^3 ^3D^{\circ} - 4f ^1D$	3-2
7235, 82	60	5,62	7,33	$3p^3 ^3D^{\circ} - 4f ^3D$	2-3
7235, 326	100	5,62	7,33	$3p^3 ^3D^{\circ} - 4f ^1D$	2-2
7226,206 7208,21 7193,90 7193,58 7184,89	100 25 30 65 70	5,61 5,62 5,62 5,62 5,61	7,33 7,34 7,34 7,34 7,34 7,34	$3p^3 \ ^3D^{\circ} - 4f \ ^1D$ $3p^3 \ ^3D^{\circ} - 4f \ ^3D$ $3p^3 \ ^3D^{\circ} - 4f \ ^3D$ $3p^3 \ ^3D^{\circ} - 4f \ ^3D$ $3p^3 \ ^3D^{\circ} - 4f \ ^3D$	1-2 3-2 2-1 2-2 1-1
7184,57	20	5,61	7,34	$3p^{3} ^{3}D^{\circ} - 4f ^{3}D$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-3 \\ 2-3 \\ 1-1 \end{array} $
7165,545	200	5,87	7,60	$3d ^{1}D^{\circ} - 5f ^{1}D$	
7164,69	70	5,87	7,60	$3d ^{1}D^{\circ} - 5f ^{3}F$	
7034,903	250	5,87	7,63	$3d ^{1}D^{\circ} - 5f ^{3}G$	
7026,62	25	5,86	7,63	$4p ^{1}P - 5d ^{3}D^{\circ}$	
7017,646	90	5,87	7,64	3d ¹ D°-5f ³ D	$ \begin{array}{c} 2-3 \\ 2-2 \\ 2-2 \end{array} $
7017,28	30	5,87	7,64	3d ¹ D°-5f ³ D	
7016,74	10	5,96	7,73	4p ³ D-6d ³ F°	

λ, Å	I	$E_{_{ m H}}$, eV	$E_{\mathbf{B}}$, eV	Transition	J
7005,883	180	5,98	7 ,75	$^{4p}_{4p}^{3}D-^{6}d^{3}F^{\circ}_{4p}^{3}D-^{6}d^{3}F^{\circ}_{4p}$	3—4
7003,5665	180	5,96	7 ,73		2—3
6992,88	15	5,87	7,64	$\begin{array}{c} 3d\ ^{1}D^{\circ}-5f\ ^{3}/_{2}\ [^{3}/_{2}]\\ 4p\ ^{3}D-6d\ ^{3}F^{\circ}\\ 4p\ ^{1}P-6d\ ^{3}P^{\circ}\\ 4p\ ^{1}P-7s\ ^{1}P^{\circ}\\ 4p\ ^{3}D-8s\ [^{3}/_{2},\ ^{1}/_{2}]^{\circ} \end{array}$	2—2
6976,523	80	5,95	7,73		1—2
6867,22	20	5,86	7,67		1—2
6848,568	30	5,86	7,67		1—1
6741,64	30	5,98	7,82		3—2
6721,853	100	5,86	7,71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2
6635,65	25	5,86	7,72		1—2
6583,71	15	5,95	7,84		1—2
6560,556	25	5,96	7,85		2—3
6555,4624	45	5,98	7,87		3—4
6527,1989	45	5,87	7,77	$\begin{array}{c} 3d\ ^{1}D^{\circ}-6f\ ^{1}/_{2}\ [^{7}/_{2}]\\ 3d\ ^{1}D^{\circ}-6f\ ^{1}/_{2}\ [^{5}/_{2}]\\ 4p\ ^{3}D-4d\ ^{3}F^{\circ}\\ 3p^{3}\ ^{3}D^{\circ}-6p\ [^{3}/_{2},\ ^{1}/_{2}]\\ 4p\ ^{1}P-8s\ ^{3}P^{\circ} \end{array}$	2—3
6526,609	45	5,87	7,77		2—3
6518,73	20	5,95	7,85		1—3
6452,29	20	5,62	7,54		3—2
6437,79	8	5,86	7,79		1—1
6414,97 6407,27 6394,67 6331,954 6279,35	25 15 15 45 15	5,87 5,87 5,87 5,08 5,86	7,80 7,80 7,81 7,04 7,84	$\begin{array}{c} 3d\ ^{1}D^{\circ}-6f\ ^{3}/_{2}\ [^{7}/_{2}]\\ 3d\ ^{1}D^{\circ}-6f\ ^{3}/_{2}\ [^{5}/_{2}]\\ 3d\ ^{1}D^{\circ}-6f\ ^{3}/_{2}\ [^{3}/_{2}]\\ 4s\ ^{1}P^{\circ}-5p\ ^{1}P\\ 4p\ ^{1}P-7d\ ^{1}D^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 2 - 3 \\ 2 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
6254,85	20	5,62	7,60	$3p^{3} \ ^{3}D^{\circ} - 5f \ ^{3}F$ $3p^{3} \ ^{3}D^{\circ} - 5f \ ^{3}F$ $4s \ ^{1}P^{\circ} - 5p \ ^{3}D$ $3p^{3} \ ^{3}D^{\circ} - 5f \ ^{1}D$ $3p^{3} \ ^{3}D^{\circ} - 5f \ ^{3}F$	3—3
6254,1876	180	5,62	7,60		3—4
6253,60	15	5,08	7,06		1—1
6244,468	125	5,62	7,60		2—2
6243,8129	125	5,62	7,60		2—3
6238,2871	40	5,08	7,07	$4s ^{1}P^{\circ} - 5p ^{3}D$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 3-3 \\ 3-4 \\ 2-3 \end{array} $
6237,3199	160	5,61	7,60	$3p^{3} ^{3}D^{\circ} - 5f ^{3}F$	
6155,70	20	5,62	7,63	$3p^{3} ^{3}D^{\circ} - 5f ^{3}G$	
6155,1338	160	5,62	7,63	$3p^{3} ^{3}D^{\circ} - 5f ^{3}G$	
6145,0151	100	5,62	7,63	$3p^{3} ^{3}D^{\circ} - 5f ^{3}G$	
6142,487	100	5,62	7,64	$3p^3 \ ^3D^{\circ} - 5f \ ^3D$	3-3
6131,850	90	5,62	7,64	$3p^3 \ ^3D^{\circ} - 5f \ ^3D$	2-3
6131,574	85	5,62	7,64	$3p^3 \ ^3D^{\circ} - 5f \ ^3D$	2-2
6125,0207	90	5,61	7,64	$3p^3 \ ^3D^{\circ} - 5f \ ^3D$	1-1
6112,926	10	5,62	7,64	$3p^3 \ ^3D^{\circ} - 5f \ ^3/_2 \ [^3/_2]$	2-2
6106,605 6091,92 6087,80 6067,624 5948,545	15 15 10 20 200	5,61 5,87 5,87 5,08 5,08	7,64 7,91 7,91 7,12 7,17	$3p^3 \ ^3D^{\circ} - 5f \ ^{3}/_{2} \ [^{3}/_{2}]$ $3d \ ^{1}D^{\circ} - 7f \ ^{3}/_{2} \ [^{7}/_{2}]$ $3d \ ^{1}D^{\circ} - 7f \ ^{3}/_{2} \ [^{5}/_{2}]$ $4s \ ^{1}P^{\circ} - 5p \ ^{3}P$ $4s \ ^{1}P^{\circ} - 5p \ ^{1}D$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 2 - 3 \\ 4 - 2 \\ 4 - 2 \end{array} $
5873,764	40	4,93	7,04	$4s ^3P^{\circ} - 5p ^1P$	1-1
5797,8591	100	4,95	7,09	$4s ^3P^{\circ} - 5p ^3D$	2-3
5793,0714	90	4,93	7,07	$4s ^3P^{\circ} - 5p ^3D$	1-2
5780,3839	70	4,92	7,06	$4s ^3P^{\circ} - 5p ^3D$	0-1
5772,1453	70	5,08	7,23	$4s ^1P^{\circ} - 5p ^1S$	1-0
5762,9769	45	5,62	7,77	$\begin{array}{c} 3p^3 \ ^3D \ ^{\circ} - 6f \ ^{1}/_{2} \ [^{7}/_{2}] \\ 4s \ ^{3}P \ ^{\circ} - 5p \ ^{3}P \\ 3p^3 \ ^{3}D \ ^{\circ} - 6f \ ^{1}/_{2} \ [^{5}/_{2}] \\ 3p^3 \ ^{3}D \ ^{\circ} - 6f \ ^{1}/_{2} \ [^{5}/_{2}] \\ 4s \ ^{3}P \ ^{\circ} - 5p \ ^{3}P \end{array}$	3-4
5754,2195	45	4,95	7,10		2-1
5753,625	45	5,62	7,77		2-3
5747,6670	45	5,61	7,77		1-2
5708,397	160	4,95	7,12		2-2
5701,1048	90	4,93	7,10	$\begin{array}{c} 4s\ ^{3}P^{\circ}-5p\ ^{3}P \\ 4s\ ^{3}P^{\circ}-5p\ ^{3}P \\ 4s\ ^{3}P^{\circ}-5p\ ^{3}S \\ 3p^{3}\ ^{3}D^{\circ}-6f\ ^{3}/_{2}\ [^{7}/_{2}] \\ 3p^{3}\ ^{3}D^{\circ}-6f\ ^{3}/_{2}\ [^{5}/_{2}] \end{array}$	1-0
5690,4251	100	4,93	7,10		1-1
5684,4843	120	4,95	7,13		2-1
5675,418	20	5,62	7,80		3-4
5669,743	10	5,62	7,80		3-3
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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
5666,677 5665,5536 5660,683 5660,502 5654,924	10 80 13 10 15	5,62 4,92 5,62 5,62 5,61	7,80 7,10 7,80 7,80 7,80 7,80	$3p^3 \ ^3D^{\circ} - 6f \ ^3/_2 \ [^{7}/_2]$ $4s \ ^3P^{\circ} - 5p \ ^3P$ $3p^3 \ ^3D^{\circ} - 6f \ ^3/_2 \ [^{5}/_2]$ $3p^3 \ ^3D^{\circ} - 6f \ ^3/_2 \ [^{5}/_2]$ $3p^3 \ ^3D^{\circ} - 6f \ ^3/_2 \ [^{5}/_2]$	$ \begin{array}{r} 2 - 3 \\ 0 - 1 \\ 2 - 3 \\ 2 - 2 \\ 1 - 2 \end{array} $
5645,960 5622,2214 5621,607 5602,875 5517,535	90 30 15 20 35	4,93 4,93 5,08 4,95 5,08	7,12 7,13 7,29 7,17 7,33	$4s ^3P^{\circ} - 5p ^3P$ $4s ^3P^{\circ} - 5p ^3S$ $4s ^1P^{\circ} - 4f ^3F$ $4s ^3P^{\circ} - 5p ^1D$ $4s ^1P^{\circ} - 4f ^1D$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 2-2 \\ 1-2 \end{array} $
5493,23 5421,61 5421,168 5156,023 5128,031	40 10 10 8 10	5,08 5,62 5,62 5,08 5,08	7,34 7,91 7,91 7,49 7,50	$\begin{array}{c} 4s{}^{1}P^{\circ}-4f{}^{3}D \\ 3p^{3}{}^{3}D^{\circ}-7f{}^{3}/_{2}[^{7}/_{2}] \\ 3p^{3}{}^{3}D^{\circ}-7f{}^{3}/_{2}[^{7}/_{2}] \\ 4s{}^{1}P^{\circ}-6p[^{1}/_{2},^{1}/_{2}] \\ 4s{}^{1}P^{\circ}-6p[^{1}/_{2},^{3}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 3-3 \\ 3-4 \\ 1-1 \\ 1-1 \end{array} $
5125,598 5006,0607 4947,6067 4851,540 4839,861	10 40 30 13 11	5,08 5,08 5,08 5,08 5,08	7,50 7,56 7,59 7,64 7,64	$\begin{array}{c} 4s ^{1}P^{\circ} - 6p \begin{bmatrix} 1/_{2}, & 3/_{2} \end{bmatrix} \\ 4s ^{1}P^{\circ} - 6p \begin{bmatrix} 3/_{2}, & 3/_{2} \end{bmatrix} \\ 4s ^{1}P^{\circ} - 6p \begin{bmatrix} 3/_{2}, & 3/_{2} \end{bmatrix} \\ 4s ^{1}P^{\circ} - 5f ^{3}D \\ 4s ^{1}P^{\circ} - 5f ^{3}/_{2} \begin{bmatrix} 3/_{2} \end{bmatrix} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-0 \\ 1-2 \\ 1-2 \end{array} $
4823,31 4821,1666 4805,4402 4792,324 4792,212	10 15 20 80 35	4,93 4,93 4,92 4,95 4,93	7,50 7,50 7,50 7,54 7,52	$\begin{array}{c} 4s {}^{3}P^{\circ} - 6p \begin{bmatrix} 1/_{2}, 3/_{2} \end{bmatrix} \\ 4s {}^{3}P^{\circ} - 6p \begin{bmatrix} 1/_{2}, 3/_{2} \end{bmatrix} \\ 4s {}^{3}P^{\circ} - 6p \begin{bmatrix} 1/_{2}, 3/_{2} \end{bmatrix} \\ 4s {}^{3}P^{\circ} - 6p \begin{bmatrix} 3/_{2}, 1/_{2} \end{bmatrix} \\ 4s {}^{3}P^{\circ} - 6p \begin{bmatrix} 1/_{2}, 1/_{2} \end{bmatrix} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 2 - 2 \\ 1 - 0 \end{array} $
4782,9905 4772,7847 4758,972 4755,2756 4747,9936	50 25 13 25 25	4,95 4,93 4,95 4,92 4,93	7,54 7,53 7,56 7,53 7,54	$\begin{array}{c} 4s\ ^{3}P^{\circ}-6p\ [^{3}/_{2},\ ^{1}/_{2}]\\ 4s\ ^{3}P^{\circ}-6p\ [^{3}/_{2},\ ^{3}/_{2}]\\ 4s\ ^{3}P^{\circ}-6p\ [^{3}/_{2},\ ^{3}/_{2}]\\ 4s\ ^{3}P^{\circ}-6p\ [^{3}/_{2},\ ^{3}/_{2}]\\ 4s\ ^{3}P^{\circ}-6p\ [^{3}/_{2},\ ^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 2-2 \\ 0-1 \\ 1-2 \end{array} $
4706,76 4638,17 4627,383 4434,69 4430,470	8 15 18 10 10	5,08 5,08 4,92 4,95	7,72 7,76 7,71 7,75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ -1-2 \\ 0-1 \\ 2-2 \end{array} $
4425,49 4392,59 4102,9359 3905,5227 3020,0044	10 10 70 300 7 5	4,95 4,93 1,91 1,91 0,03	7,75 7,75 4,93 5,08 4,13	$4s {}^{3}P^{\circ} - 7p [{}^{3}/_{2}, {}^{1}/_{2}]$ $4s {}^{3}P^{\circ} - 7p [{}^{3}/_{2}, {}^{1}/_{2}]$ $3p^{2} {}^{1}S - 4s {}^{3}P^{\circ}$ $3p^{2} {}^{1}S - 4s {}^{1}P^{\circ}$ $3p^{2} {}^{3}P - 3p^{3} {}^{5}S^{\circ}$	2-1 1-2 0-1 0-1 2-2
3006,7387 2987,6453 2970,3547 2881,5792 2842,3345	50 150 55 1000 15	0,01 0,78 0,78 0,78 0,78 1,91	4,13 4,93 4,95 5,08 6,27	$3p^{2} ^{3}P - 3p^{3} ^{5}S^{\circ}$ $3p^{2} ^{1}D - 4s ^{3}P^{\circ}$ $3p^{2} ^{1}D - 4s ^{3}P^{\circ}$ $3p^{2} ^{1}D - 4s ^{1}P^{\circ}$ $3p^{2} ^{1}S - 3d ^{3}P^{\circ}$	1-2 2-1 2-2 2-1 0-1
2631 ,2819 2577 ,1514 2568 ,6407 2564 ,8242 2563 ,6787	85	1,91 1,91 1,91 0,78 0,78	6,62 6,72 6,73 5,61 5,62	$3p^{2} {}^{1}S - 3d {}^{1}P^{\circ}$ $3p^{2} {}^{1}S - 3d {}^{3}D^{\circ}$ $3p^{2} {}^{1}S - 5s {}^{3}P^{\circ}$ $3p^{2} {}^{1}D - 3p^{3} {}^{3}D^{\circ}$ $3p^{2} {}^{1}D - 3p^{3} {}^{3}D^{\circ}$	0-1 0-1 0-1 2-1 2-2
2532,3814 2528,5086 2524,1079 2519,2023 2516,1125	450 425 350	1,91 0,03 0,01 0,01 0,03	6,80 4,93 4,92 4,93 4,95	$3p^{2} {}^{1}S - 5s {}^{1}P^{\circ}$ $3p^{2} {}^{3}P - 4s {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 4s {}^{3}P^{\circ}$ $3p^{2} {}^{1}D - 4s {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 4s {}^{3}P^{\circ}$	0-1 $2-1$ $1-0$ $1-1$ $2-2$
2514,3161 2506,8973 2452,1180	$ \begin{array}{r} 375 \\ 425 \\ 70 \end{array} $	0,00 0,01 0,03	4,93 4,95 5,08	$3p^{2} ^{3}P$ — $4s ^{3}P^{\circ}$ $3p^{2} ^{1}D$ — $4s ^{3}P^{\circ}$ $3p^{2} ^{3}P$ — $4s ^{1}P^{\circ}$	0-1 1-2 2-1

λ, Å	1	E _H , eV	E _B , eV	Transition	J
2443 ,3643	65	0,01	5,08	$3p^2 \ ^3P - 4s \ ^1P^{\circ} \ 3p^2 \ ^3P - 4s \ ^1P^{\circ}$	1-1
2438 ,7674	65	0,00	5,08		0-1
2435,1545	300	0,78	5,87	$3p^{2} ^{1}D - 3d ^{1}D^{\circ}$	2-2
2303,0585	55	1,91	7,29	$3p^{2} ^{1}S - 4d ^{1}P^{\circ}$	0-1
2295,401	10	0,78	6,18	$3p^{2} ^{1}D - 3d ^{3}F^{\circ}$	2-2
2291,034	35	0,78	6,19	$3p^{2} ^{1}D - 3d ^{3}F^{\circ}$	2-3
2289,6074	20	1,91	7,32	$3p^{2} ^{1}S - 4d ^{3}D^{\circ}$	0-1
2278,281	10	1,91	7,35	$3p^{2} {}^{1}S - 6s {}^{3}P^{\circ}$	0-1 $0-1$ $2-1$ $2-2$ $2-3$
2259,587	10	1,91	7,39	$3p^{2} {}^{1}S - 6s {}^{1}P^{\circ}$	
2218,9148	50	0,03	5,61	$3p^{2} {}^{3}P - 3p^{3} {}^{3}D^{\circ}$	
2218,0569	120	0,03	5,62	$3p^{2} {}^{3}P - 3p^{3} {}^{3}D^{\circ}$	
2216,6688	120	0,03	5,62	$3p^{2} {}^{3}P - 3p^{3} {}^{3}D^{\circ}$	
2211,7441	110	0,01	5,61	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	1-1
2210,8940	115	0,01	5,62	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	1-2
2207,9783	110	0,00	5,61	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	0-1
2177,432	10	1,91	7,60	$3p^2 \ ^1S - 5d \ ^1P^\circ$	0-1
2147,911	50	1,91	7,68	$3p^2 \ ^1S - 6d \ ^3P^\circ$	0-1
2124,1225	100	0,78	6,62	$3p^{2} ^{1}D - 3d ^{1}F^{\circ}$	2—3
2122,994	15	0,78	6,62	$3p^{2} ^{1}D - 3d ^{1}P^{\circ}$	2—1
2121,1945	10	0,03	5,87	$3p^{2} ^{3}P - 3d ^{1}D^{\circ}$	2—2
2114,631	30	0,01	5,87	$3p^{2} ^{3}P - 3d ^{1}D^{\circ}$	1—2
2103,213	30	1,91	7,80	$3p^{2} ^{1}S - 6d ^{3}D^{\circ}$	0—1
2094,211	10	1,91	7,83	$3p^{2} {}^{1}S - 8s {}^{1}P^{\circ}$	0-1
2084,4669	10	0,78	6,73	$3p^{2} {}^{1}D - 3d {}^{3}D^{\circ}$	2-3
2065,516	30	4,13	10,16	$3p^{3} {}^{5}S^{\circ} - 4s {}^{5}P$	2-3
2061,192	40	4,13	10,14	$3p^{3} {}^{5}S^{\circ} - 4s {}^{5}P$	2-2
2058,136	15	0,78	6,80	$3p^{2} {}^{1}D - 5s {}^{1}P^{\circ}$	2-1
2054,828 2010,974 2008,439 1991,848 1988,9950	50 30 15 50 15	4,13 0,03 0,01 0,78 0,03	10,13 6,19 6,18 7,00 6,26	$3p^{3} {}^{5}S^{\circ} - 4s {}^{5}P$ $3p^{2} {}^{3}P - 3d {}^{3}F^{\circ}$ $3p^{2} {}^{3}P - 3d {}^{3}F^{\circ}$ $3p^{2} {}^{1}D - 4d {}^{1}D^{\circ}$ $3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	2-1 2-3 1-2 2-2 2-2 2-2
1986,3637	10	0,03	6,27	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 4-2 \\ 4-1 \\ 4-0 \end{array} $
1984,434	30	0,78	7,03	$3p^{2} ^{1}D - 3p^{3} ^{3}P^{\circ}$	
1983,2341	20	0,01	6,26	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	
1980,6203	15	0,01	6,27	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	
1979,2062	15	0,01	6,27	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	
1977,5982	15	0,00	6,27	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	0-1
1954,966	100	0,78	7,42	$3p^{2} ^{1}D - 4d ^{3}F^{\circ}$	2-3
1904,660	50	0,78	7,29	$3p^{2} ^{1}D - 4d ^{1}P^{\circ}$	2-1
1901,331	1000	0,78	7,30	$3p^{2} ^{1}D - 4d ^{1}F^{\circ}$	2-3
1893,245	200	0,78	7,33	$3p^{2} ^{1}D - 4d ^{3}D^{\circ}$	2-3
1887,700	200	0,78	7,35	$3p^{2} ^{1}D - 6s ^{3}P^{\circ}$	2-1
1881,851	200	0,03	6,62	$3p^{2} ^{3}P - 3d ^{1}F^{\circ}$	2-3
1880,953	20	0,03	6,62	$3p^{2} ^{3}P - 3d ^{1}P^{\circ}$	2-1
1875,809	100	0,01	6,62	$3p^{2} ^{3}P - 3d ^{1}P^{\circ}$	1-1
1874,838	500	0,78	7,39	$3p^{2} ^{1}D - 6s ^{1}P^{\circ}$	2-1
1873,100	100	0,00	6,62	$3p^{2} \ ^{3}P - 3d \ ^{1}P^{\circ}$	0-1
1853,148	50	0,03	6,72	$3p^{2} \ ^{3}P - 3d \ ^{3}D^{\circ}$	2-1
1852,464	200	0,03	6,72	$3p^{2} \ ^{3}P - 3d \ ^{3}D^{\circ}$	2-2
1851,791	30	0,78	7,48	$3p^{2} \ ^{1}D - 5d \ ^{1}D^{\circ}$	2-2
1850,668	500	0,03	6,73	$3p^{2} \ ^{3}P - 3d \ ^{3}D^{\circ}$	2-3
1848,737	100	0,03	6,73	$3p^2 \ ^3P - 5s \ ^3P^\circ$	2-1
1848,144	200	0,01	6,72	$3p^2 \ ^3P - 3d \ ^3D^\circ$	1-1
1847,468	400	0,01	6,72	$3p^2 \ ^3P - 3d \ ^3D^\circ$	1-2
1846,103	100	0,01	6,73	$3p^2 \ ^3P - 5s \ ^3P^\circ$	1-0
1845,510	300	0,00	6,72	$3p^2 \ ^3P - 3d \ ^3D^\circ$	0-1
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λ, λ	I	$E_{ m H}$, eV	$E_{\rm B}$, eV	Transition	J
1843,765 1841,440 1841,146 1838,006 1836,506	200 200 100 30 200	0,01 0,03 0,00 0,78 0,01	6,73 6,76 6,73 7,53 6,76	$3p^2 \ ^3P - 5s \ ^3P^\circ$ $3p^2 \ ^3P - 5d \ ^3F^\circ$ $3p^2 \ ^3P - 5s \ ^3P^\circ$	$ \begin{array}{c} 1-1 \\ 2-2 \\ 0-1 \\ 2-3 \\ 1-2 \end{array} $
1829,893 1822,452 1814,068 1809,092 1799,122	20 50 500 500 400	0,03 0,00 0,78 0,78 0,78	6,80 6,80 7,62 7,63 7,67	$3p^{2} ^{3}P - 5s ^{1}P^{\circ}$ $3p^{2} ^{3}P - 5s ^{1}P^{\circ}$ $3p^{2} ^{1}D - 5d ^{1}F^{\circ}$ $3p^{2} ^{1}D - 5d ^{3}D^{\circ}$ $3p^{2} ^{1}D - 7s ^{1}P^{\circ}$	2-1 0-1 2-3 2-3 2-1
1797,343 1790,292 1783,232 1776,826 1770,922	15 20 50 100 100	0,78 0,78 0,78 0,03 0,03	7,68 7,71 7,73 7,00 7,03	$3p^{2} ^{1}D - 6d ^{3}P^{\circ}$ $3p^{2} ^{1}D - 6d ^{1}D^{\circ}$ $3p^{2} ^{1}D - 6d ^{3}F^{\circ}$ $3p^{2} ^{3}P - 4d ^{1}D^{\circ}$ $3p^{2} ^{3}P - 3p^{3} ^{3}P^{\circ}$	2-1 2-2 2-3 2-2 2-2
1770,629 1769,762 1766,346 1766,060 1765,60	30 15 20 30 30	0,03 0,78 0,01 0,01 0,78	7,03 7,79 7,03 7,03 7,80	$3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $3p^{2} {}^{1}D - 6d {}^{1}F^{\circ}$ $3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $3p^{2} {}^{1}D - 6d {}^{3}D^{\circ}$	2-1 2-3 1-2 1-1 2-3 1-0
1765,030 1763,664 1759,601 1753,112 1747,404	40 50 20 30 50	0,01 0,00 0,78 0,78 0,03	7,03 7,03 7,83 7,85 7,12	$3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $3p^{2} {}^{1}D - 8s {}^{1}P^{\circ}$ $3p^{2} {}^{1}D - 7d {}^{3}F^{\circ}$ $3p^{2} {}^{3}P - 4d {}^{3}F^{\circ}$ $3p^{2} {}^{3}P - 4d {}^{3}F^{\circ}$	1—0 0—1 2—1 2—3 2—3 1—2
1745,332 1743,884 1740,378 1734,769 1704,434	15 30 20 10 50	0,01 0,78 0,78 0,78 0,03	7,11 7,89 7,90 7,93 7,30	$3p^{2} ^{3}P - 4d ^{3}F$ $3p^{2} ^{1}D - 7d ^{3}F^{\circ}$ $3p^{2} ^{1}D - 7d ^{3}D^{\circ}$ $3p^{2} ^{1}D - 8d ^{3}F^{\circ}$ $3p^{2} ^{3}P - 4d ^{1}F^{\circ}$ $3p^{2} ^{3}P - 4d ^{1}P^{\circ}$	2-3 2-3 2-3 2-3 2-3 1-1
1702,862 1700,626 1700,423 1699,716 1697,938	30 30 50 10 200	0,01 0,00 0,03 0,03 0,03	7,29 7,29 7,32 7,32 7,33	$3p^{2} {}^{3}P - 4d {}^{1}P^{\circ} \\ 3p^{2} {}^{3}P - 4d {}^{3}D^{\circ} \\ 3p^{2} {}^{3}P - 4d {}^{3}D^{\circ} \\ 3p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 2-2 \\ 2-1 \\ 2-3 \\ 1-2 \end{array} $
1696,203 1695,507 1693,461 1693,292 1690,786	200 50 20 50 30	0,01 0,01 0,03 0,00 0,01	7,32 7,32 7,35 7,35 7,32 7,34	$3p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $3p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $3p^{2} {}^{3}P - 6s {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 4d {}^{3}D^{\circ}$ $3p^{2} {}^{3}P - 6s {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 6s {}^{3}P^{\circ}$	1-1 2-1 0-1 1-0
1689,290 1687,095 1686,815 1682,675 1676,818	50 15 30 30 10	0,01 0,00 0,03 0,01 0,00	7,35 7,35 7,38 7,38 7,39	$3p^{2} {}^{3}P - 6s {}^{3}P^{\circ} \\ 3p^{2} {}^{3}P - 6s {}^{3}P^{\circ} \\ 3p^{2} {}^{3}P - 6s {}^{3}P^{\circ} \\ 3p^{2} {}^{3}P - 6s {}^{1}P^{\circ}$	1—1 0—1 2—2 1—2 0—1
1675,198 1672,593 1671,111 1668,517 1667,618	200 100 20 100 100	0,03 0,03 0,01 0,01 0,01	7,43 7,44 7,43 7,44 7,44	$3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$	2—2 2—1 1—2 1—1 1—0
1666,369 1664,521 1660,484 1653,351 1651,013	50 30 10 30 20	0,00 0,03 0,01 0,03 0,01	7,44 7,48 7,48 7,53 7,52	$3p^{2} {}^{3}P - 5d {}^{3}P^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{1}D^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{1}D^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}F^{\circ}$ $3p^{2} {}^{3}P - 5d {}^{3}F^{\circ}$	0-1 $2-2$ $1-2$ $2-3$ $1-2$
1640 ,257 1638 ,274 1633 ,978	20 10 50	4,13 4,13 0,03	11 ,71 11 ,70 7 ,62	$3p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $3p^{3} {}^{5}S^{\circ} - 3d {}^{5}P$ $3p^{2} {}^{3}P - 5d {}^{1}F^{\circ}$	2—1 2—2 2—2

λ, Å	I	$E_{ m II}^{},~{ m eV}$	E _B , eV	Transition	J
1633,318 1633,203	15 15	0,03 0,01	7,62 7,60	$3p^2 ^3P - 5d ^3D^{\circ} \ 3p^2 ^3P - 5d ^1P^{\circ}$	2—2 1—1
1631,134 1629,921 1629,426 1625,707 1625,534	75 200 300 30 45	0,00 0,03 0,01 0,00 0,01	7,60 7,63 7,62 7,63 7,64	$3p^{2} ^{3}P - 5d ^{1}P^{\circ}$ $3p^{2} ^{3}P - 5d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 5d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 5d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 7s ^{3}P^{\circ}$	0-1 $2-3$ $1-2$ $0-1$ $1-1$
1622,867 1620,389 1619,531 1616,571 1615,937	$100 \\ 20 \\ 10 \\ 20 \\ 20$	0,03 0,03 0,01 0,01 0,01	7,67 7,68 7,66 7,68 7,68	$3p^2$ 3P $-6d$ 3P $^\circ$ $3p^2$ 3P $-6d$ 3P $^\circ$ $3p^2$ 3P $-7s$ 3P $^\circ$ $3p^2$ 3P $-6d$ 3P $^\circ$ $3p^2$ 3P $-5d$ 3P $^\circ$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
1614,650 1614,557 1608,900 1597,950 1595,760	10 10 10 30 20	0,03 0,00 0,03 0,03 0,03	7,71 7,68 7,73 7,79 7,78	$3p^2 \ ^3P - 6d \ ^1D^{\circ} \ 3p^2 \ ^3P - 6d \ ^3P^{\circ} \ 3p^2 \ ^3P - 6d \ ^3F^{\circ} \ 3p^2 \ ^3P - 6d \ ^1F^{\circ} \ 3p^2 \ ^3P - 8s \ ^3P^{\circ}$	$ \begin{array}{r} 2-2 \\ 0-1 \\ 2-3 \\ 2-3 \\ 1-0 \end{array} $
1594,927 1594,548 1592,409 1586,783 1586,133	50 150 50 20 15	0,03 0,03 0,01 0,00 0,00	7,80 7,80 7,80 7,81 7,83	$3p^{2} ^{3}P - 6d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 6d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 6d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 6d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 6d ^{3}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-2 \\ 0-1 \\ 1-0 \end{array} $
1580,303 1576,817 1575,115 1574,817 1573,874	10 15 20 50 50	$0,01 \\ 0,03 \\ 0,01 \\ 0,03 \\ 0,03 \\ 0,03$	7,85 7,89 7,88 7,90 7,90	$3p^2 \ ^3P - 7d \ ^3F^{\circ} \ 3p^2 \ ^3P - 7d \ ^1F^{\circ} \ 3p^2 \ ^3P - 9s \ [^{1}/_{2}, \ ^{1}/_{2}]^{\circ} \ 3p^2 \ ^3P - 7d \ ^3P^{\circ} \ 3p^2 \ ^3P - 7d \ ^3D^{\circ}$	1—3 2—3 1—0 2—2 2—3
1573,650 1571,377 1569,322 1568,172 1567,703	20 10 10 15 10	$0,03 \\ 0,01 \\ 0,03 \\ - \\ 0,01$	7,91 7,90 7,93 — 7,92	$3p^{2} ^{3}P - 7d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 7d ^{3}D^{\circ}$ $3p^{2} ^{3}P - 8d ^{3}F^{\circ}$ - $3p^{2} ^{3}P - 9s [^{3}/_{2}, ^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 2-3 \\ -1-2 \end{array} $
1564,589 1561,982 1561,792 1560,739 1560,067	10 10 10 10 15 15	0,01 0,03 0,01 0,03 —	7,93 7,96 7,95 7,97	$3p^2 \ ^3P - 8d \ ^3F^\circ \ 3p^2 \ ^3P - 8d \ ^3P^\circ \ 3p^2 \ ^3P - 10s \ [^{1}_{2}, \ ^{1}_{2}]^\circ \ 3p^2 \ ^3P - 8d \ ^3D^\circ \ -$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 1-0 \\ 2-3 \\ \end{array} $
1258,795 1256,490 1255,276	50 40 10	0,03 0,01 0,00	9,88 9,88 9,88	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2 - 1 \\ 1 - 1 \\ 0 - 1 \end{array} $

Si II, ground state $1s^2 2s^2 2p^6 3s^2 3p {}^2 P^0_{1/2}$ Ionization potential 131 838,4 cm⁻¹; 16,345 eV

λ, Å	I	$E_{ m H}$, eV	EB, eV	Transition	J
9412,72 8044,50 7911.47 7849,72 7848,80	100 15 10 500 400	12,84 13,93 14,10 12,52 12,52	14,15 15,47 15,67 14,10 14,10	$4f\ ^{2}F^{\circ}-5g\ ^{2}G$ $5d\ ^{2}D-8f\ ^{2}F^{\circ}$ $5f\ ^{2}F^{\circ}-9g\ ^{2}G$ $4d\ ^{2}D-5f\ ^{2}F^{\circ}$ $4d\ ^{2}D-5f\ ^{2}F^{\circ}$	- $ -$
7312,29 7125,84 282	3 4	14,10 12,88	15,80 14,62	$5f {}^{2}F^{\circ}$ — $10g {}^{2}G$ $5p^{2} P^{\circ}$ — $7s {}^{2}S$	3/ ₂ —1/ ₂

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
6829,82 6818,45 6751,88	40 20 5	12,88 12,88 14,50	14,69 14,69 16,34	5p ² P°—6d ² D 5p ² P°—6d ² D 4s' ⁴ P°—4p' ⁴ D	3/2 - 5/2 $1/2 - 3/2$ $3/2 - 1/2$
6750,28 6717,04 6699,38 6679,65 6671,88	20 50 20 3 100	14,53 14,50 14,49 12,84 14,53	16,36 16,35 16,35 14,69 16,39	$4s' 4P^{\circ} - 4p' 4D$ $4s' 4P^{\circ} - 4p' 4D$ $4s' 4P^{\circ} - 4p' 4D$ $4f 2F^{\circ} - 6d 2D$ $4s' 4P^{\circ} - 4p' 4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ - 5/2 - 7/2 \end{array} $
6665,00 6660,52 6371,359 6347,103 6239,630	15 50 1000 1000 100	14,49 14,50 8,12 8,12 12,84	16,35 16,36 10,07 10,07 14,82	$4s' ^4P^{\circ} - 4p' ^4D$ $4s' ^4P^{\circ} - 4p' ^4D$ $4s ^2S - 4p ^2P^{\circ}$ $4s ^2S - 4p ^2P^{\circ}$ $4f ^2F^{\circ} - 6g ^2G$	$\begin{array}{c} {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2} - {}^{5}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{3}/_{2} \\ - \end{array}$
6160,16 6155,17 6131,76 6086,67 6080,06	5 5 4 10 20	16,64 16,62 16,61 16,61 16,64	18,65 18,63 18,63 18,65 18,68	$4p' ^4P - 5s' ^4P^{\circ}$	$\begin{array}{c} 5/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 1/_2 - 3/_2 \\ 5/_2 - 5/_2 \end{array}$
6067,45 6030,27 6019,76 5978,929 5957,561	10 5 4 500 500	16,62 16,62 10,07 10,07	18,68 18,65 12,15 12,15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} -\\ 3/_2-5/_2\\ 3/_2-3/_2\\ 3/_2-1/_2\\ 1/_2-1/_2 \end{array} $
5915,220 5868,404 5867,483 5846,134 5827,801	150 300 10 50 30	14,53 14,53 14,50 14,50 14,49	16,62 16,64 16,61 16,62 16,61	4s' 4P°—4p' 4P 4s' 4P°—4p' 4P 4s' 4P°—4p' 4P 4s' 4P°—4p' 4P 4s' 4P°—4p' 4P	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
5806,738 5800,468 5794,90 5785,73 5706,370	200 150 30 30 100	14,49 14,50 16,45 16,44 14,17	16,62 16,64 18,59 18,58 16,34	$4s' ext{ } 4P^{\circ} ext{ } -4p' ext{ } 4P $ $4s' ext{ } 4P^{\circ} ext{ } -4p' ext{ } 4P $ $4p' ext{ } ^2P ext{ } -4d' ext{ } ^2D^{\circ} $ $4p' ext{ } ^2P ext{ } -4d' ext{ } ^2D^{\circ} $ $3d' ext{ } ^4F^{\circ} ext{ } -4p' ext{ } ^4D $	$1/_{2}$ $3/_{2}$ $3/_{2}$ $5/_{2}$ $3/_{2}$ $5/_{2}$ $1/_{2}$ $3/_{2}$ $1/_{2}$ $3/_{2}$ $1/_{2}$ $1/_{2}$ $1/_{2}$
5701,374 5688,811 5681,44 5669,562 5660,656	200 300 30 1000 150	14,17 14,18 14,17 14,20 14,17	16,35 16,36 16,35 16,38 16,36	$3d' {}^{4}F^{\circ} - 4p' {}^{4}D$ $3d' {}^{4}F^{\circ} - 4p' {}^{4}D$ $3d' {}^{4}F^{\circ} - 4p' {}^{4}D$ $3d' {}^{4}F^{\circ} - 4p' {}^{4}D$ $3d' {}^{4}F^{\circ} - 4p' {}^{4}D$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \end{array}$
5639,478 5632,973 5605,351 5576,661 5575,973	200 100 3 150 5	14,53 14,18 14,17 14,50 12,88	16,72 16,38 16,38 16,72 15,10	$4s' ext{ }^4P^{\circ} - 4p' ext{ }^4S$ $3d' ext{ }^4F^{\circ} - 4p' ext{ }^4D$ $3d' ext{ }^4F^{\circ} - 4p' ext{ }^4D$ $4s' ext{ }^4P^{\circ} - 4p' ext{ }^4S$ $5p ext{ }^2P^{\circ} - 8s ext{ }^2S$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
5540 ,74 5496 ,45 5478 ,73 5469 ,450 5469 ,21	100 200 5 30 100	14,49 16,72 16,64 12,88 16,72	16,72 18,98 18,90 15,14 18,99	$4s' ^4P^{\circ} - 4p' ^4S$ $4p' ^4S - 4d' ^4P^{\circ}$ $4p' ^4P - 4d' ^4D^{\circ}$ $5p ^2P^{\circ} - 7d ^2D$ $4p' ^4S - 4d' ^4P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
5466,868 5466,432 5462,146 5456,45 5454,49	500 500 10 100 15	12,52 12,52 12,88 16,64 16,72	14,79 14,79 15,14 18,91 19,00	$4d^{2}D-6f^{2}F^{\circ}$ $4d^{2}D-6f^{2}F^{\circ}$ $5p^{2}P^{\circ}-7d^{2}D$ $4p'^{4}P-4d'^{4}D^{\circ}$ $4p'^{4}S-4d'^{4}P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
5447,26 5438,62 5432,89 5428,92 5417,24	20 100 15 15 15	16,62 16,62 16,61 16,61 16,36	18,90 18,90 18,89 18,90 18,65	$4p' \ ^4P - 4d' \ ^4D^{\circ}$ $4p' \ ^4D - 5s' \ ^4P^{\circ}$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$ $5/2 - 3/2$

		1			
λ, Å	I	E _H , eV	E _B , eV	Transition	J
5415,64 5405,34 5393,18 5380,48 5354,89	5 100 3 5 5	16,35 16,38 16,34 16,35 16,36	18,63 18,68 18,63 18,65 18,68	$4p' \ ^4D - 5s' \ ^4P^\circ$ $4p' \ ^4D - 5s' \ ^4P^\circ$	$ \begin{array}{c} 3/2 - 1/2 \\ 7/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
5295,19 5269,74 5257,64 5240,31 5219,37	30 3 3 5	16,64 16,64 16,62 16,38 {16,36 16,62	18,98 18,99 18,98 18,75 18,74 19,00	4p' 4P—4d' 4P° 4p' 4P—4d' 4P° 4p' 4P—4d' 4P° 4p' 4D—4d' 4F° 4p' 4D—4d' 4F° 4p' 4P—4d' 4P°	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
5202,413 5192,86 5185,535 5185,25 5181,90	500 200 100 100 100	(16,38 (16,35 16,36 12,84 16,35 16,34	18,77 18,73 18,75 15,23 18,74 18,73	$4p' \ ^4D - 4d' \ ^4F^\circ$ $4p' \ ^4D - 4d' \ ^4F^\circ$ $4p' \ ^4D - 4d' \ ^4F^\circ$ $4f \ ^2F^\circ - 7g \ ^2G$ $4p' \ ^4D - 4d' \ ^4F^\circ$ $4p' \ ^4D - 4d' \ ^4F^\circ$	7/2 - 9/2 $3/2 - 3/2$ $5/2 - 7/2$ $ 3/2 - 5/2$ $1/2 - 3/2$
5056,314 5055,981 5041,026 4932,80 4908,18	30 1000 1000 20 5	10,07 10,07 10,07 16,77 16,77	12,52 12,52 12,52 12,52 19,29 19,29	$4p^{2}P^{\circ}-4d^{2}D$ $4p^{2}P^{\circ}-4d^{2}D$ $4p^{2}P^{\circ}-4d^{2}D$ $3p^{3}^{2}D^{\circ}-4f^{\prime}^{2}F$ $3p^{3}^{2}D^{\circ}-4f^{\prime}^{4}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4906,99 4902,65 4883,20 4861,095 4850,550	20 3 15 10 5	16,38 12,88 16,36 12,52 12,88	18,91 15,41 18,90 15,07 15,43	$4p' ^4D - 4d' ^4D^{\circ}$ $5p ^2P^{\circ} - 9s ^2S$ $4p' ^4D - 4d' ^4D^{\circ}$ $4d ^2D - 4s' ^2P^{\circ}$ $5p ^2P^{\circ} - 8d ^2D$	7/2 - 7/2 $3/2 - 1/2$ $5/2 - 5/2$ $5/2 - 3/2$ $3/2 - 5/2$
4845,26 4792,29 4782,89 4776,20 4673,273	3 5 3 3 20	16,34 16,45 16,44 16,38 12,84	18,89 19,03 19,03 18,98 15,49	$4p' \ ^4D - 4d' \ ^4D^{\circ}$ $4p' \ ^2P - 4d' \ ^2P^{\circ}$ $4p' \ ^2P - 4d' \ ^2P^{\circ}$ $4p' \ ^4D - 4d' \ ^4P^{\circ}$ $4f \ ^2F^{\circ} - 8g \ ^2G$	$\begin{array}{c} {}^{1}/{}_{2} - {}^{1}/{}_{2} \\ {}^{3}/{}_{2} - {}^{3}/{}_{2} \\ {}^{1}/{}_{2} - {}^{1}/{}_{2} \\ {}^{7}/{}_{2} - {}^{5}/{}_{2} \\ - \end{array}$
4621 ,721 4621 ,418 4376 ,957 4259 ,202 4232 ,864	150 100 5 5 10	12,52 12,52 12,84 12,15 12,15	15,21 15,21 15,67 15,05 15,07	$4d\ ^{2}D-7f\ ^{2}F^{\circ}\ 4d\ ^{2}D-7f\ ^{2}F^{\circ}\ 4f\ ^{2}F^{\circ}-9g\ ^{2}G\ 5s\ ^{2}S-4s'\ ^{2}P^{\circ}\ 5s\ ^{2}S-4s'\ ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ - \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
4200,898 4200,657 4198,133 4190,724 4187,137	40 30 50 100 5	12,52 12,52 13,49 13,49 12,84	15,47 15,47 16,44 16,45 15,80	$\begin{array}{c} 4d\ ^{2}D-8f\ ^{2}F^{\circ} \\ 4a\ ^{2}D-8f\ ^{2}F^{\circ} \\ 3d'\ ^{2}D^{\circ}-4p'\ ^{2}P \\ 3d'\ ^{2}D^{\circ}-4p'\ ^{2}P \\ 4f\ ^{2}F^{\circ}-10g\ ^{2}G \end{array}$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ - \end{array}$
4183 ,345 4130 ,893 4128 ,067 4076 ,781 4075 ,451	10 500 300 15 20	13,49 9,84 9,84 9,84 9,84	16,45 12,84 12,84 12,88 12,88	$3d' ^2D^{\circ} - 4p' ^2P$ $3d ^2D - 4f ^2F^{\circ}$ $3d ^2D - 4f ^2F^{\circ}$ $3d ^2D - 5p ^2P^{\circ}$ $3d ^2D - 5p ^2P^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array}$
4072 ,711 4016 ,22 3998 ,01 3991 ,77 3977 ,46	3 5 10 15 10	9,84 16,35 16,32 16,35 16,32	12,88 19,44 19,43 19,46 19,44	$3d^{2}D-5p^{2}P^{\circ}$ $3d'^{2}F^{\circ}-4f'^{4}G$ $3d'^{2}F^{\circ}-4f'^{2}G$ $3d'^{2}F^{\circ}-4f'^{2}G$ $3d'^{2}F^{\circ}-4f'^{4}G$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array} $
3955,74 3954,507 3954,296 3919,00 3862,595 3856,017	10 10 5 5 200 500	16,35 12,52 12,52 16,32 6,86 6,86	19,49 15,66 15,66 19,49 10,07	$3d' {}^{2}F^{\circ} - 4f' {}^{2}D$ $4d {}^{2}D - 9f {}^{2}F^{\circ}$ $4d {}^{2}D - 9f {}^{2}F^{\circ}$ $3d' {}^{2}F^{\circ} - 4f' {}^{2}D$ $3p^{2} {}^{2}D - 4p {}^{2}P^{\circ}$ $3p^{2} {}^{2}D - 4p {}^{2}P^{\circ}$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3853,664 284	100	6,86	10,07	$3p^{2} {}^{2}D - 4p^{2} P^{\circ}$ $3p^{2} {}^{2}D - 4p^{2} P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
3339 ,819	500	10,07	13,78	4p ² P°-6s ² S	$\frac{3}{2}$ _1 $\frac{1}{2}$ _1 $\frac{1}{2}$ _2 $\frac{1}{2}$ _2 $\frac{3}{2}$ _5 $\frac{5}{2}$
3333 ,139	300	10,07	13,78	4p ² P°-6s ² S	
3223 ,01	20	15,45	19,29	3d' ⁴ P°-4f' ⁴ F	
3220,44	10	15,44	19,29	$3d' ^4P^{\circ} - 4f' ^2F$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
3217,99	15	15,44	19,29	$3d' ^4P^{\circ} - 4f' ^4F$	
3214,66	75	15,44	19,30	$3d' ^4P^{\circ} - 4f' ^4F$	
3210,025	200	10,07	13,93	$4p ^2P^{\circ} - 5d ^2D$	
3203,872	100	10,07	13,93	$4p ^2P^{\circ} - 5d ^2D$	
3202,49	20	15,43	19,30	$3d' ^4D^{\circ} - 4f' ^4F$	7/2 $-7/2$ $7/2$ $-9/2$ $1/2$ $-3/2$ $5/2$ $-7/2$ $3/2$ $-3/2$
3199,514	200	15,43	19,30	$3d' ^4D^{\circ} - 4f' ^4F$	
3195,41	100	15,41	19,29	$3d' ^4D^{\circ} - 4f' ^4F$	
3194,69	50	15,41	19,29	$3d' ^4D^{\circ} - 4f' ^2F$	
3194,21	50	15,41	19,29	$3d' ^4D^{\circ} - 4f' ^4F$	
3193,09	150	15,41	19,29	$3d' ^4D^{\circ} - 4f' ^4F$	3/2 - 5/2 $5/2 - 5/2$ $5/2 - 7/2$ $3/2 - 1/2$ $7/2 - 9/2$
3192,25	50	15,41	19,29	$3d' ^4D^{\circ} - 4f' ^4F$	
3188,97	150	15,41	19,30	$3d' ^4D^{\circ} - 4f' ^4F$	
3185,99	10	15,07	18,96	$4s' ^2P^{\circ} - 4p' ^2S$	
3149,92	20	16,38	20,32	$4p' ^4D - 5d' ^4F^{\circ}$	
3053,184 3048,30 3045,77 3043,85 3043,692	150 50 10 10 100	15,44 15,45 15,45 15,44 (15,45 (15,45	19,50 19,51 19,52 19,51 19,52 19,53	$3d' {}^{4}P^{\circ} - 4f' {}^{4}D$ $3d' {}^{4}P^{\circ} - 4f' {}^{4}D$	5/2 $-7/2$ $3/2$ $-5/2$ $1/2$ $-3/2$ $5/2$ $-5/2$ $3/2$ $-5/2$ $3/2$ $-1/2$
3042,191 3041,573 3039,21 3030,000 3021,55	$\begin{array}{c} 30 \\ 20 \\ 3 \\ 100 \\ 20 \end{array}$	15,43 15,45 15,44 15,41 15,41	19,50 19,53 19,52 19,50 19,51	$3d' ^4D^{\circ} - 4f' ^4D$ $3d' ^4P^{\circ} - 4f' ^4D$ $3d' ^4P^{\circ} - 4f' ^4D$ $3d' ^4D^{\circ} - 4f' ^4D$ $3d' ^4D^{\circ} - 4f' ^4D$	7/2 $-7/2$ $3/2$ $-1/2$ $5/2$ $-3/2$ $5/2$ $-7/2$ $3/2$ $-5/2$
3015,980	3	15,41	19,52	$3d' ^4D^{\circ} - 4f' ^4D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
3014,920	3	15,41	19,52	$3d' ^4D^{\circ} - 4f' ^4D$	
2905,692	500	9,84	14,10	$3d^2 D - 5f ^2F^{\circ}$	
2904,283	300	9,84	14,10	$3d ^2D - 5f ^2F^{\circ}$	
2887,511	10	9,84	14,13	$3d ^2D - 6p ^2P^{\circ}$	
2887,358 2834,472 2820,580 2726,702 2682,210	5 3 2 5 10	9,84 10,41 10,39 10,07 10,07	14,13 14,79 14,78 14,62 14,69	$3d^{2}D-6p^{2}P^{\circ}$ $3p^{2}^{2}P-7p^{2}P^{\circ}$ $3p^{2}^{2}P-7p^{2}P^{\circ}$ $4p^{2}P^{\circ}-7s^{2}S$ $4p^{2}P^{\circ}-6d^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
2677,906	3	10,07	14,69	$4p^{2}P^{\circ}-6d^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
2659,781	5	10,41	15,07	$3p^{2}^{2}P-4s'^{2}P^{\circ}$	
2655,803	3	10,39	15,05	$3p^{2}^{2}P-4s'^{2}P^{\circ}$	
2554,530	10	10,41	15,27	$3p^{2}^{2}P-8p^{2}P^{\circ}$	
2544,046	3	10,39	15,26	$3p^{2}^{2}P-8p^{2}P^{\circ}$	
2501,970	5	9,84	14,79	$3d^{2}D-6f^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 9/2 - 9/2 \\ 7/2 - 7/2 \\ 7/2 - 9/2 \end{array} $
2500,928	3	9,84	14,79	$3d^{2}D-6f^{2}F^{\circ}$	
2428,45	10	14,20	19,30	$3d'^{4}F^{\circ}-4f'^{4}F$	
2423,42	3	14,18	19,30	$3d'^{4}F^{\circ}-4f'^{4}F$	
2421,72	3	14,18	19,30	$3d'^{4}F^{\circ}-4f'^{4}F$	
2420,19 2374,255 2366,972 2366,053 2364,33	3 5 5 5 3 5	14,17 9,84 9,84 9,84 14,20	19,29 15,05 15,07 15,07 19,44 19,42	$3d' {}^{4}F^{\circ}-4f' {}^{4}F$ $3d {}^{2}D-4s' {}^{2}P^{\circ}$ $3d {}^{2}D-4s' {}^{2}P^{\circ}$ $3d {}^{2}D-4s' {}^{2}P^{\circ}$ $3d' {}^{4}F^{\circ}-4f' {}^{4}G$ $3d' {}^{4}F^{\circ}-4f' {}^{4}G$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 9/2 - 9/2 \\ 5/2 - 5/2 \end{array} $
2360,59 2360,20 2357,97 2357,18 2356,295	5 10 50 30 100	14,17 14,17 14,18 14,17 14,20	19,44 19,44 19,42 19,46	$3d' {}^{4}F^{\circ} - 4f' {}^{2}G$ $3d' {}^{4}F^{\circ} - 4f' {}^{4}G$ $3d' {}^{4}F^{\circ} - 4f' {}^{4}G$ $3d' {}^{4}F^{\circ} - 4f' {}^{4}G$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 7/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \\ 9/2 - 11/2 \end{array} $

λ, Å	I	E _H , eV	$E_{ m B}^{}$, eV	Transition	J
2353,09 2350,174 2349,54 2344,203 2334,606	20 20 10 10 30	14,17 0,04 14,18 0,04 0,04	19,44 5,31 19,46 5,32 5,34	$3d' {}^{4}F^{\circ}$ — $4f' {}^{4}G$ $3p {}^{2}P^{\circ}$ — $3p^{2} {}^{4}P$ $3d' {}^{4}F^{\circ}$ — $4f' {}^{2}G$ $3p {}^{2}P^{\circ}$ — $3p^{2} {}^{4}P$ $3p {}^{2}P^{\circ}$ — $3p^{2} {}^{4}P$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 1/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2334,404 2136,560 2136,402 2133,99 2072,701	30 50 30 40 200	0,00 13,49 13,49 13,49 6,86	5,31, 19,29 19,29 19,29 12,84	$3p ^{2}P^{\circ} - 3p^{2} ^{4}P$ $3d' ^{2}D^{\circ} - 4f' ^{2}F$ $3d' ^{2}D^{\circ} - 4f' ^{2}F$ $3d' ^{2}D^{\circ} - 4f' ^{2}F$ $3p^{2} ^{2}D^{\circ} - 4f ^{2}F^{\circ}$	$^{1}/_{2}$ — $^{1}/_{2}$ $^{5}/_{2}$ — $^{7}/_{2}$ $^{3}/_{2}$ — $^{5}/_{2}$ $^{5}/_{2}$ — $^{7}/_{2}$ $^{5}/_{2}$ — $^{7}/_{2}$
2072,016 2059,014 2058,646 2016,654 1949,564	200 50 50 3 100	6,86 6,86 6,86 9,50 10,41	12,84 12,88 12,88 15,65 16,77	$3p^{2} {}^{2}D - 4f {}^{2}F^{\circ}$ $3p^{2} {}^{2}D - 5p {}^{2}P^{\circ}$ $3p^{2} {}^{2}D - 5p {}^{2}P^{\circ}$ $3p^{2} {}^{2}S - 3d' {}^{2}P^{\circ}$ $3p^{2} {}^{2}P - 3p^{3} {}^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
1949,331 1945,504 1944,586 1941,667 1910,621	10 3 15 50 50	10,41 10,07 10,07 10,39 9,84	16,77 16,44 16,45 16,77 16,32	$3p^{2} {}^{2}P - 3p^{3} {}^{2}D^{\circ}$ $4p {}^{2}P^{\circ} - 4p' {}^{2}P$ $4p {}^{2}P^{\circ} - 4p' {}^{2}P$ $3p^{2} {}^{2}P - 3p^{3} {}^{2}D^{\circ}$ $3d {}^{2}D - 3d' {}^{2}F^{\circ}$	3/2 - 3/2 $1/2 - 1/2$ $3/2 - 3/2$ $1/2 - 3/2$ $3/2 - 5/2$
1905,878 1904,326 1902,459 1870,782 1870,227	3 5 100 3 15	12,52 12,52 9,84 6,86 6,86	19,03 19,03 16,35 13,49 13,49	$4d\ ^{2}D-4d'\ ^{2}P^{\circ}\ 4d\ ^{2}D-4d'\ ^{2}P^{\circ}\ 3d\ ^{2}D-3d'\ ^{2}F^{\circ}\ 3p^{2}\ ^{2}D-3d\ ^{2}D^{\circ}\ 3p^{2}\ ^{2}D-3d\ ^{2}D^{\circ}$	3/2 - 1/2 $5/2 - 3/2$ $5/2 - 7/2$ $5/2 - 3/2$ $3/2 - 3/2$
1869,317 1817,445 1816,921 1808,003 1787,538	20 10 200 150 8	6,86 0,04 0,04 0,00 9,84	13,49 6,86 6,86 6,86 16,77	$3p^{2} {}^{2}D - 3d {}^{2}D^{\circ}$ $3p {}^{2}P^{\circ} - 3p^{2} {}^{2}D$ $3p {}^{2}P^{\circ} - 3p^{2} {}^{2}D$ $3p {}^{2}P^{\circ} - 3p^{2} {}^{2}D$ $3d {}^{2}D - 3p^{3} {}^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
1786,817 1711,296 1710,826 1704,967 1661,059	$\begin{array}{c} 4 \\ 20 \\ 10 \\ 2 \\ 3 \end{array}$	9,84 6,86 6,86 6,86 10,39	16,77 14,10 14,10 14,13 17,85	$3d^{2}D - 3p^{3}^{2}D^{\circ}$ $3p^{2}^{2}D - 5f^{2}F^{\circ}$ $3p^{2}^{2}D - 5f^{2}F^{\circ}$ $3p^{2}^{2}D - 6p^{2}P^{\circ}$ $3p^{2}^{2}P - 3p^{3}^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
1564,066 1563,765 1562,845 1562,451 1533,445	5 10 15 10 1000	6,86 6,86 6,86 6,86 0,04	14,78 14,79 14,79 14,79 8,12	$3p^{2} {}^{2}D - 7p {}^{2}P^{\circ} \ 3p^{2} {}^{2}D - 7p {}^{2}P^{\circ} \ 3p^{2} {}^{2}D - 6f {}^{2}F^{\circ} \ 3p^{2} {}^{2}D - 6f {}^{2}F^{\circ} \ 3p {}^{2}P^{\circ} - 4s {}^{2}S$	3/2 - 1/2 $5/2 - 3/2$ $5/2 - 7/2$ $3/2 - 5/2$ $3/2 - 1/2$
1526,719 1518,221 1516,910 1513,570 1512,072	500 5 60 30 50	0,00 10,41 10,41 10,39 6,86	8,12 18,58 18,59 18,58 15,05	$3p^{2}P^{\circ}-4s^{2}S$ $3p^{2}^{2}P-4d'^{2}D^{\circ}$ $3p^{2}^{2}P-4d'^{2}D^{\circ}$ $3p^{2}^{2}P-4d'^{2}D^{\circ}$ $3p^{2}^{2}D-4s^{2}P^{\circ}$	1/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$
1509 ,101 1508 ,741 1485 ,513 1485 ,224 1485 ,024	100 3 100 30 90	6,86 6,86 9,50 6,86 9,50	15,07 15,07 17,85 15,21 17,85	$3p^{2} {}^{2}D - 4s {}^{2}P^{\circ} \ 3p^{2} {}^{2}D - 4s {}^{2}P^{\circ} \ 3p^{2} {}^{2}S - 3p^{3} {}^{2}P^{\circ} \ 3p^{2} {}^{2}D - 7f {}^{2}F^{\circ} \ 3p^{2} {}^{2}S - 3p^{3} {}^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
1484 ,873 1475 ,188 1474 ,649 1438 ,931 1417 ,781	15 5 15 4 5	6,86 6,86 6,86 6,86 9,84	15,21 15,26 15,27 15,47 18,58	$3p^{2} {}^{2}D - 7f {}^{2}F^{\circ}$ $3p^{2} {}^{2}D - 8p {}^{2}P^{\circ}$ $3p^{2} {}^{2}D - 8p {}^{2}P^{\circ}$ $3p^{2} {}^{2}D - 8f {}^{2}F^{\circ}$ $3d {}^{2}D - 4d' {}^{2}D^{\circ}$	3/2 - 5/2 $3/2 - 1/2$ $3/2 - 1/2$ $5/2 - 3/2$ $5/2 - 7/2$ $3/2 - 3/2$
1416,972 1410,219 1409,073	10 20 10	9,84 6,86 6,86	18,59 15,65 15,65	$3d\ ^{2}D-4d'\ ^{2}D^{\circ} \ 3p^{2}\ ^{2}D-3d'\ ^{2}P^{\circ} \ 3p^{2}\ ^{2}D-3d'\ ^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
1404,478 1403,783	6 5	6,86 6,86	15,68 15,69	$3p^2 ^2D - 10p ^2P^{\circ} \ 3p^2 ^2D - 10p ^2P^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
1353,718 1352,635 1350,658 1350,520 1350,057	100 100 20 20 150	5,34 5,32 5,31 5,32 5,34	14,50 14,49 14,49 14,50 14,53	$3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array}$
1348,543 1346,873 1309,458 1309,274 1305,590	$100 \\ 100 \\ 20 \\ 200 \\ 50$	5,31 5,32 6,86 0,04 6,86	14,50 14,53 16,32 9,50 16,35	$3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 4s' {}^{4}P^{\circ}$ $3p^{2} {}^{2}D - 3d' {}^{2}F^{\circ}$ $3p {}^{2}P^{\circ} - 3p^{2} {}^{2}S$ $3p^{2} {}^{2}D - 3d' {}^{2}F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
1304,369 1265,023 1264,730 1260,418 1251,164	100 200 2000 1000 200	0,00 0,04 0,04 0,00 5,34	9,50 9,84 9,84 9,84 15,25	$3p ^{2}P^{\circ} - 3p^{2} ^{2}S$ $3p ^{2}P^{\circ} - 3d ^{2}D$ $3p ^{2}P^{\circ} - 3d ^{2}D$ $3p ^{2}P^{\circ} - 3d ^{2}D$ $3p ^{2}P^{\circ} - 3d ^{2}D$ $3p^{2} ^{4}P - 3p^{3} ^{4}S^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
1250,433 1250,089 1248,426 1246,738 1235,920	150 100 150 100 10	6,86 6,86 5,32 5,31	16,77 16,77 15,25 15,25	$3p^{2} {}^{2}D - 3p^{3} {}^{2}D^{\circ}$ $3p^{2} {}^{2}D - 3p^{3} {}^{2}D^{\circ}$ $3p^{2} {}^{4}P - 3p^{3} {}^{4}S^{\circ}$ $3p^{2} {}^{4}P - 3p^{3} {}^{4}S^{\circ}$ -	$\begin{array}{c} {}^{5/2}_{2} - {}^{5/2}_{2} \\ {}^{3/2}_{2} - {}^{3/2}_{2} \\ {}^{3/2}_{2} - {}^{3/2}_{2} \\ - {}^{1/2}_{2} - {}^{3/2}_{2} \end{array}$
1231,406 1229,388 1228,746 1228,617 1228,437	5200 150 25 10	5,34 5,34 5,32 5,32 5,32	15,41 15,43 15,41 15,41 15,41	$\begin{array}{c} 3p^2 ^4P - 3d' ^4D^{\circ} \\ 3p^2 ^4P - 3d' ^4D^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
1227,604 1226,986 1226,887 1226,814 1224,972	100 40 20 50 10	5,34 5,31 5,34 5,31 5,32	15,44 15,41 15,45 15,41 15,44	$3p^{2} {}^{4}P - 3d' {}^{4}P^{\circ}$ $3p^{2} {}^{4}P - 3d' {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d' {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d' {}^{4}D^{\circ}$ $3p^{2} {}^{4}P - 3d' {}^{4}P^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
1224,252 1223,907 1222,635 1216,117 1197,389	$ \begin{array}{c} 20 \\ 20 \\ 5 \\ 10 \\ 100 \end{array} $	5,32 5,32 5,31 - 0,04	15,45 15,45 15,45 10,39	$\begin{array}{c} 3p^{2} ^{4}P - 3d' ^{4}P^{\circ} \\ 3p^{2} ^{4}P - 3d' ^{4}P^{\circ} \\ 3p^{2} ^{4}P - 3d' ^{4}P^{\circ} \\ - \\ 3p ^{2}P^{\circ} - 3p^{2} ^{2}P \end{array}$	$\begin{array}{c} {}^{3}/{}_{2} - {}^{3}/{}_{2} \\ {}^{3}/{}_{2} - {}^{1}/{}_{2} \\ {}^{1}/{}_{2} - {}^{3}/{}_{2} \\ - \\ {}^{3}/{}_{2} - {}^{1}/{}_{2} \end{array}$
1194,496 1193,284 1190,418 1127,907 1127,442	$250 \\ 200 \\ 100 \\ 40 \\ 20$	0,04 0,00 0,00 6,86 6,86	10,41 10,39 10,41 17,85 17,85	$3p^{2}P^{\circ}-3p^{2}^{2}P$ $3p^{2}P^{\circ}-3p^{2}^{2}P$ $3p^{2}P^{\circ}-3p^{2}^{2}P$ $3p^{2}P^{\circ}-3p^{2}^{2}P$ $3p^{2}^{2}D-3p^{3}^{2}P^{\circ}$ $3p^{2}^{2}D-3p^{3}^{2}P^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
1057,503 1057,050 1023,693 1020,699 992,675	$ \begin{array}{r} 45 \\ 30 \\ 50 \\ 25 \\ 200 \end{array} $	6,86 6,86 0,04 0,00 0,04	18,58 18,59 12,15 12,15 12,52	$3p^{2} 2D - 4d' 2D^{\circ}$ $3p^{2} 2D - 4d' 2D^{\circ}$ $3p 2P^{\circ} - 5s 2S$ $3p 2P^{\circ} - 5s 2S$ $3p 2P^{\circ} - 4d 2D$	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \end{array}$
989,867 931,667 931,200 929,810 928,297	100 5 5 20 5	0,00 5,34 5,32 5,34 5,32	12,52 18,65 18,63 18,68 18,68	$3p^{2}P^{\circ}-4d^{2}D$ $3p^{2}^{4}P-5s'^{4}P^{\circ}$ $3p^{2}^{4}P-5s'^{4}P^{\circ}$ $3p^{2}^{4}P-5s'^{4}P^{\circ}$ $3p^{2}^{4}P-5s'^{4}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
913 ,853 913 ,264 913 ,012 912 ,459 912 ,375	20 3 10 5 5	5,34 5,32 5,32 5,31 5,31	18,91 18,90 18,90 18,89 18,90	$3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}3p^{2} \stackrel{4P}{-}4d' \stackrel{4D^{\circ}}{-}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $

λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
909,209 901,735 899,405 891,999 889,722	3 20 10 200 100	5,34 0,04 0,00 0,04 0,00	18,98 13,78 13,78 13,78 13,93 13,93	$3p^{2} {}^{4}P - 4d' {}^{4}P^{\circ}$ $3p {}^{2}P^{\circ} - 6s {}^{2}S$ $3p {}^{2}P^{\circ} - 6s {}^{2}S$ $3p {}^{2}P^{\circ} - 5d {}^{2}D$ $3p {}^{2}P^{\circ} - 5d {}^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
850,142 848,074 845,774 843,718 822,844	10 5 40 20 5	0,04 0,00 0,04 0,00 0,04	14,62 14,62 14,69 14,69 15,10	$3p ^{2}P^{\circ} - 7s ^{2}S$ $3p ^{2}P^{\circ} - 7s ^{2}S$ $3p ^{2}P^{\circ} - 6d ^{2}D$ $3p ^{2}P^{\circ} - 6d ^{2}D$ $3p ^{2}P^{\circ} - 8s ^{2}S$	3/2 - 1/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$
821,450 820,918 820,516 818,590 805,101 755,362	$\begin{array}{c} 2\\ 3\\ 20\\ 2\\ 10\\ 2 \end{array}$	5,34 0,00 0,04 0,00 0,04 0,04	20,43 15,10 15,14 15,14 15,43 16,45	$3p^{2} {}^{4}P - 5d' {}^{4}D^{\circ}$ $3p^{2}P^{\circ} - 8s^{2}S$ $3p^{2}P^{\circ} - 7d^{2}D$ $3p^{2}P^{\circ} - 7d^{2}D$ $3p^{2}P^{\circ} - 8d^{2}D$ $3p^{2}P^{\circ} - 4p^{2}P$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array}$

Si III, ground state $1s^2\,2s^2\,2p^6\,3s^2\,{}^1S_0$ Ionization potential 270 139,3 cm $^{-1}$; 33,491 eV

λ, Α	I	$E_{ m H},~{ m eV}$	E_{B} , eV	Transition	J
9799,906 9323,899 9173,267 8728,019 8341,931	2 3 2 3 2	25,33 20,55 30,23 33,16 29,25	26,59 21,88 31,58 34,58 30,73	$4d ^{1}D - 5p ^{1}P^{\circ}$ $3d ^{1}D - 4p ^{1}P^{\circ}$ $6f ^{1}F^{\circ} - 8d ^{1}D$ $4d' ^{1}D^{\circ} - 4f' [3^{1}/_{2}]$ $4s' ^{1}P^{\circ} - 4p' ^{1}D$	$ \begin{array}{r} 2-1 \\ 2-1 \\ 3-2 \\ 2-3 \\ 1-2 \end{array} $
8292,615 8271,944 8271,377 8269,324 8265,640	3 6 5 8 5	30,08 26,65 26,65 26,65 26,65	31,57 28,15 28,15 28,15 28,15	$6h {}^{3,1}H^{\circ} - 8i {}^{3,1}I$ $5p {}^{3}P^{\circ} - 5d {}^{3}D$ $5p {}^{3}P^{\circ} - 5d {}^{3}D$ $5p {}^{3}P^{\circ} - 5d {}^{3}D$ $5p {}^{3}P^{\circ} - 5d {}^{3}D$	$ \begin{array}{c} -\\ 0-1\\ 1-1\\ 1-2\\ 2-2 \end{array} $
8262,568 8212,05 8194,71 8194,18 8191,679	9 2 3 3 8	26,65 30,05 30,06 30,06 28,54	28,15 31,56 31,57 31,57 30,06	$5p \ ^3P^{\circ} - 5d \ ^3D \ 6f \ ^3F^{\circ} - 8g \ ^3G \ 6g \ ^3,^1G - 8h \ ^3,^1H^{\circ} \ 6g \ ^3,^1G - 8h \ ^3,^1H^{\circ} \ 5f \ ^3F^{\circ} - 6g \ ^3G$	2—3 — 5—— 3,4—— 4—5
8191,16 8190,431 8103,448 8102,862 7612,356	6 7 11 9 12	$ \begin{array}{c} 28,54 \\ 28,54 \\ 28,54 \\ 28,55 \\ 28,55 \\ 28,55 \\ 26,59 \end{array} $	30,06 30,06 30,06 30,08 30,08 28,22	$5f ^3F^{\circ} - 6g ^3G$ $5f ^3F^{\circ} - 6g ^1G$ $5f ^3F^{\circ} - 6g ^3G$ $5g ^3,^1G - 6h ^3,^1H^{\circ}$ $5g ^3,^1G - 6h ^3,^1H^{\circ}$ $5p ^1P^{\circ} - 5d ^1D$	3-4 3-4 2-3 5 3, 4 1-2
7497,286 7466,322 7465,669 7462,624 7461,890	3 9 4 8 5	26,81 24,99 24,99 24,99 24,99	28,46 26,65 26,65 26,65 26,65	$3d' \ ^3P^{\circ} - 6s \ ^3S \ 4d \ ^3D - 5p \ ^3P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ} \ 4d \ ^3D - 5p \ ^3P^{\circ}$	$ \begin{array}{r} 1-1 \\ 3-2 \\ 2-2 \\ 1, 2-1 \\ 1-0 \end{array} $
7442,327 7408,467 7267,090 7151,08 7047,58	4 3 2 2 5	26,80 28,42 28,08 30,23 28,35	28,46 29,79 29,79 31,96 30,11	$3d' ^3P^{\circ} - 6s ^3S$ $4s' ^3P^{\circ} - 6d ^3D$ $4s' ^3P^{\circ} - 6d ^3D$ $6f ^1F^{\circ} - 9d ^1D$ $3d' ^1P^{\circ} - 4p' ^1P$	2-1 2-3 1-2 3-2 1-1
6851,65 6851,18 288	7 3	24,99 24,99	26,80 26,80	4d ³ D-3d′ ³ P° 4d ³ D-3d′ ³ P°	$ \begin{array}{c} 3-2 \\ 2-2 \end{array} $

λ, Α	I	$E_{ m H}$, eV	E _B , eV	Transition	J
6834,38 6834,08 6831,560	2 4 6	26,65 26,65 26,65	28,46 28,46 28,46	$5p\ ^3P^{\circ}-6s\ ^3S \ 5p\ ^3P^{\circ}-6s\ ^3S \ 5p\ ^3P^{\circ}-6s\ ^3S$	0—1 1—1 2—1
6805,244 6776,623 6535,163 6524,357 6522,626	4 2 2 6 4	24,99 24,99 30,08 28,15 28,15	26,81 26,82 31,97 30,05 30,05	$4d\ ^3D - 3d'\ ^3P^\circ \ 4d\ ^3D - 3d'\ ^3P^\circ \ 6h\ ^3,^1H^\circ - 9i\ ^3,^1I \ 5d\ ^3D - 6f\ ^3F^\circ \ 5d\ ^3D - 6f\ ^3F^\circ \ $	1, 2—1 1—0 — 3—3, 4 2—2, 3
6521,485 6471,86 6314,459 6173,712 6169,835	3 2 7 3 3	28,15 30,06 26,59 19,72 28,22	30,05 31,97 28,56 21,73 30,23	$5d\ ^3D-6f\ ^3F^\circ \ 6g\ ^3,^1G-9h\ ^3,^1H^\circ \ 5p\ ^1P^\circ-6s\ ^1S \ _{4s\ ^1S-4p\ ^3P^\circ \ 5d\ ^1D-6f\ ^1F^\circ \ }$	1-2 5 1-0 0-1 2-3
6152,556 5898,788 5810,187 5739,733 5716,289	$\begin{array}{c} 2 \\ 10 \\ 3 \\ 20 \\ 8 \end{array}$	29,05 27,96 28,22 19,72 25,98	31,07 30,06 30,35 21,88 28,15	$6p ^{1}P^{\circ} - 7d ^{1}D$ $5f ^{1}F^{\circ} - 6g ^{1}G$ $5d ^{1}D - 7p ^{1}P^{\circ}$ $4s ^{1}S - 4p ^{1}P^{\circ}$ $4f ^{3}F^{\circ} - 5d ^{3}D$	1—2 3—4 2—1 0—1 4—3
5704,598 5703,121 5696,50 5695,522 5601,461	7 4 7 3 2	25,98 25,98 25,97 25,97 28,15	28,15 28,15 28,15 28,15 28,15 30,36	$4f {}^{3}F^{\circ} - 5d {}^{3}D$ $4f {}^{3}F^{\circ} - 5d {}^{3}D$ $4f {}^{3}F^{\circ} - 5d {}^{3}D$ $4f {}^{3}F^{\circ} - 5d {}^{3}D$ $5d {}^{3}D - 7p {}^{3}P^{\circ}$	3-2 3-3 2-1 2-2 1-0
5600,952 5599,246 5539,926 5490,114 5473,045	3 4 3 7	28,15 28,15 28,12 28,08 28,12	30,36 30,36 30,35 30,34 30,38	$5d\ ^{3}D$ - $7p\ ^{3}P^{\circ}$ $5d\ ^{3}D$ - $7p\ ^{3}P^{\circ}$ $4s'\ ^{3}P^{\circ}$ - $4p'\ ^{3}D$ $4s'\ ^{3}P^{\circ}$ - $4p'\ ^{3}D$ $4s'\ ^{3}P^{\circ}$ - $4p'\ ^{3}D$	2-1 3-2 2-2 1-1 2-3
5451,961 5451,462 5303,415 5197,264 5135,110	4 6 2 5 3	28,06 28,08 28,54 28,35 28,35	30,34 30,35 30,88 30,73 30,76	$4s' ^3P^{\circ} - 4p' ^3D$ $4s' ^3P^{\circ} - 4p' ^3D$ $5f ^3F^{\circ} - 7d ^3D$ $3d' ^1P^{\circ} - 4p' ^1D$ $3d' ^1P^{\circ} - 4p' ^3P$	0-1 $1-2$ $4-3$ $1-2$ $1-2$
5114,116 5113,76 5091,419 4912,332 4842,57	8 7 10 4 5	28,54 28,54 28,54 28,55 25,56 25,56	30,97 30,97 30,97 30,98 28,08 28,12	$5f ^3F^{\circ} - 7g ^3G$ $5f ^3F^{\circ} - 7g ^3G$ $5f ^3F^{\circ} - 7g ^3G$ $5g ^3,^1G - 7h ^3,^1H^{\circ}$ $5s ^3S - 4s' ^3P^{\circ}$ $5s ^3S - 4s' ^3P^{\circ}$	4-5 3-4 2-3 - 1-1 1-2
4828,968 4819,718 4813,330 4800,428 4734,627	18 16 15 8 2	25,98 25,98 25,97 25,77 28,12	28,55 28,55 28,55 28,35 30,73	4f ³ F° — 5g ³ G 4f ³ F° — 5g ³ G 4f ³ F° — 5g ³ G 5s ¹ S — 3a' ¹ P° 4s' ³ P° — 4p' ¹ D	4-4. 5 3-3, 4 2-3 0-1 2-2
4730 ,549 4716 ,651 4683 ,797 4683 ,022 4665 ,869	8	28,42 25,33 28,08 28,12 28,08	30,74 27,96 30,72 30,76 30,74	$4s' ^3P^{\circ} - 4p' ^3P$ $4d ^1D - 5f ^1F^{\circ}$ $4s' ^3P^{\circ} - 4p' ^3P$ $4s' ^3P^{\circ} - 4p' ^3P$ $4s' ^3P^{\circ} - 4p' ^3P$	2-1 2-3 1-0 2-2 1-1
4638,277 4619,657 4574,759 4567,823 4553,996	20 25 8	28,06 28,08 19,01 19,01 28,12	30,74 30,76 21,72 21,73 30,84 21,74	$4s' \ ^{3}P^{\circ} - 4p' \ ^{3}P$ $4s' \ ^{3}P^{\circ} - 4p' \ ^{3}P$ $4s \ ^{3}S - 4p \ ^{3}P^{\circ}$ $4s \ ^{3}S - 4p \ ^{3}P^{\circ}$ $4s' \ ^{3}P^{\circ} - 4p' \ ^{3}S$ $4s' \ ^{3}P^{\circ} - 4p' \ ^{3}S$ $4s' \ ^{3}S - 4p' \ ^{3}P^{\circ}$	0-1 $1-2$ $1-0$ $1-1$ $2-1$ $1-2$
4552,616 4494,048 4482,884 4468,452 4423,556	$\begin{array}{c} 6 \\ 3 \\ 2 \end{array}$	19,01 28,08 28,11 28,06 30,38	30,84 30,88 30,88 30,84 33,18	$4s^{3}B^{-1}p^{1}$ $4s^{3}P^{\circ}-4p^{\prime}$ $3S$ $4s^{\prime}$ $3P^{\circ}-7d$ $3D$ $4s^{\prime}$ $3P^{\circ}-4p^{\prime}$ $3S$ $4p^{\prime}$ $3D-4cl^{\prime}$ $3F^{\circ}$	1-1 2-3 0-1 3-4

λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}},{ m eV}$	Transition	J
4406,721	8	28,15	30,96	$5d ^3D - 7f ^3F^{\circ}$	$ \begin{array}{c} 3-3, \ 4 \\ 2-2, \ 3 \\ 1-2 \\ 3-2 \\ 4-5 \end{array} $
4405,901	6	28,15	30,96	$5d ^3D - 7f ^3F^{\circ}$	
4405,351	4	28,15	30,96	$5d ^3D - 7f ^3F^{\circ}$	
4377,626	8	25,39	28,22	$4f ^1F^{\circ} - 5d ^1D$	
4356,821	4	34,58	37,42	$4f' [3^{1}/_{2}] - 5g' [4^{1}/_{2}]^{\circ}$	
4356,100	2	34,58	37,42	$\begin{array}{c} 4f' \ [3^{1}/_{2}] - 5g' \ [3^{1}/_{2}]^{\circ} \\ 4f' \ [3^{1}/_{2}] - 5g' \ [4^{1}/_{2}]^{\circ} \\ 4f' \ [3^{1}/_{2}] - 5g' \ [3^{1}/_{2}]^{\circ} \\ 4f' \ [2^{1}/_{2}] - 5g' \ [3^{1}/_{2}]^{\circ} \\ 4f' \ [2^{1}/_{2}] - 5g' \ [3^{1}/_{2}]^{\circ} \end{array}$	3—3
4355,525	3	34,58	37,42		4—4
4355,281	3	34,58	37,42		3—4
4352,810	2	34,57	37,42		3—3
4351,974	2	34,57	37,42		3—4
4341,400	8	29,25	32,10	$4 s'^{1}P^{\circ} - 4p'^{1}S$	1—0
4338,501	9	19,02	21,88	$3p^{2}^{1}S - 4p^{1}P^{\circ}$	0—1
4211,679	2	28,54	31,49	$5f^{3}F^{\circ} - 8d^{3}D$	4—3
4115,504	5	27,96	30,97	$5f^{1}F^{\circ} - 7g^{1}G$	3—4
4111,512	3	28,54	31,56	$5f^{3}F^{\circ} - 8g^{3}G$	4—5
4111,255	2	28,54	31,56	$5f ^3F^{\circ} - 8g ^3G$	$ \begin{array}{c} 3-4, \ 3 \\ 2-1 \\ -1 \\ 1-2 \\ 1-0 \end{array} $
4102,422	8	25,33	28,35	$4d ^1D - 3d' ^1P^{\circ}$	
4101,86	5	28,55	31,57	$5g ^3 \cdot ^1G - 8h ^3 \cdot ^1H^{\circ}$	
4064,113	2	30,11	33,16	$4p' ^1P - 4d' ^1D^{\circ}$	
4030,752	2	24,99	28,06	$4d ^3D - 4s' ^3P^{\circ}$	
4010,192 3981,238 3963,838 3956,66 3953,080	4 5 6 2 4	$ \begin{array}{c} 24,99 \\ 27,96 \\ 21,88 \\ 24,99 \\ 26,65 \\ 26,65 \end{array} $	28,08 31,07 24,99 28,12 29,78 29,79	$4d\ ^{3}D-4s'\ ^{3}P^{\circ}\ 5f\ ^{1}F^{\circ}-7d\ ^{1}D\ 4p\ ^{1}P^{\circ}-4d\ ^{3}D\ 4d\ ^{3}D-4s'\ ^{3}P^{\circ}\ 5p\ ^{3}P^{\circ}-6d\ ^{3}D\ 5p\ ^{3}P^{\circ}-6d\ ^{3}D$	1, 2-1 3-2 1-1, 2 2, 3-2 0-1 1-2
3947,488	6	26,65	29,79	$5p ^{3}P^{\circ} - 6d ^{3}D$	2-3
3924,468	20	25,39	28,55	$4f ^{1}F^{\circ} - 5g ^{1}G$	3-4
3842,458	7	26,59	29,82	$5p ^{1}P^{\circ} - 6d ^{1}D$	1-2
3806,544	30	21,74	24,99	$4p ^{3}P^{\circ} - 4d ^{3}D$	2-2, 3
3796,114	25	21,73	24,99	$4p ^{3}P^{\circ} - 4d ^{3}D$	1-1, 2
3791 ,41	20	21,73	24,99	$4p\ ^{3}P^{\circ}-4d\ ^{3}D$ $5p\ ^{3}P^{\circ}-7s\ ^{3}S$ $5p\ ^{3}P^{\circ}-7s\ ^{3}S$ $5p\ ^{3}P^{\circ}-7s\ ^{3}S$ $5d\ ^{1}D-8f\ ^{1}F^{\circ}$	0-1
3682 ,25	2	26,65	30,02		0-1
3682 ,15	5	26,65	30,02		1-1
3681 ,402	7	26,65	30,02		2-1
3676 ,731	3	28,22	31,59		2-3
3662,366	2	26,95	30,34	$3d' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 3-2 \\ 2-2 \\ 3-3, 4 \end{array} $
3655,112	4	26,95	30,34	$3d' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	
3651,721	2	26,96	30,35	$3d' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	
3645,123	6	26,95	30,35	$3d' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	
3639,445	5	28,15	31,55	$5d \ ^{3}D - 8f \ ^{3}F^{\circ}$	
3638,898	3	28,15	31,55	$5d\ ^3D - 8f\ ^3F^\circ$	2-2, 3
3638,524	2	28,15	31,55	$5d\ ^3D - 8f\ ^3F^\circ$	1-2
3637,943	2	26,95	30,35	$3d'\ ^3D^\circ - 4p'\ ^3D$	1-2
3622,538	8	26,96	30,38	$3d'\ ^3D^\circ - 4p'\ ^3D$	3-3
3619,581	3	28,55	31,97	$5g\ ^3G - 9h\ ^3, ^1H^\circ$	5
3590,465	20	21,88	25,33	$4p ^{1}P^{\circ} - 4d ^{1}D$	$ \begin{array}{r} 1-2 \\ 4-3 \\ 1-0 \\ 3-2 \\ 1-1 \end{array} $
3580,050	3	24,69	28,15	$3d' ^{3}F^{\circ} - 5d ^{3}D$	
3569,673	8	26,59	30,07	$5p ^{1}P^{\circ} - 7s ^{1}S$	
3563,11	2	24,67	28,15	$3d' ^{3}F^{\circ} - 5d ^{3}D$	
3525,939	9	26,59	30,11	$5p ^{1}P^{\circ} - 4p' ^{1}P$	
3486,911 3440,37 3439,242 3346,717 3321,578	15 5 3 2 4	24,99 27,96 21,73 26,65 26,65	28,54 31,56 25,33 30,35 30,38	$4d\ ^{3}D-5f\ ^{3}F^{\circ}$ $5f\ ^{1}F^{\circ}-8g\ ^{1}G$ $4p\ ^{3}P^{\circ}-4d\ ^{1}D$ $5p\ ^{3}P^{\circ}-4p'\ ^{3}D$ $5p\ ^{3}P^{\circ}-4p'\ ^{3}D$	3-4 1-2 1-2 2-3
3279,258 3276,264 290	7 10	26,95 26,95	30 ,73 30 ,74	3d' ³ D°—4p' ³ P 3d' ³ D°—4p' ³ P	$\begin{array}{c} 1 - 0 \\ 2 - 1 \end{array}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3270 ,456 3258 ,664 3254 ,800	6 12 7	26,95 26,96 25,98	30,74 30,76 29,79	3d' ³ D°-4p' ³ P 3d' ³ D°-4p' ³ P 4f ³ F°-6d ³ D	1—1 3—2 4—3
3253,741 3253,401 3253,117 3241,622 3233,954	5 7 4 15 14	25,98 26,95 25,97 21,74 21,73	29,79 30,76 29,78 25,56 25,56	$4f ^3F^{\circ} - 6d ^3D$ $3d' ^3D^{\circ} - 4p' ^3P$ $4f ^3F^{\circ} - 6d ^3D$ $4p ^3P^{\circ} - 5s ^3S$ $4p ^3P^{\circ} - 5s ^3S$	3-2 $2-2$ $2-1$ $2-1$ $1-1$
3230,499 3216,249 3210,554 3196,504	12 7 15 14	21,72 25,33 24,69 24,67 24,67	25,56 29,18 28,55 28,55 28,55	$4p ^{3}P^{\circ} - 5s ^{3}S$ $4d ^{1}D - 3d' ^{1}F^{\circ}$ $3d' ^{3}F^{\circ} - 5g ^{3}G$ $3d' ^{3}F^{\circ} - 5g ^{3}G$ $3d' ^{3}F^{\circ} - 5g ^{1}G$ $3d' ^{3}F^{\circ} - 5g ^{3}G$	0-1 2-3 4-4, 5 3-3, 4 3-4 2-3
3186,022 3185,125 3165,38 3163,281 3161,610 3147,371	13 16 2 2 8 7	24,66 21,88 26,81 26,82 25,33 26,80	28,55 25,77 30,73 30,74 29,25 30,74	$\begin{array}{c} 3a \ ^{1}P^{\circ} - 3s \ ^{1}S \\ 3a' \ ^{3}P^{\circ} - 4p' \ ^{3}P \\ 3a' \ ^{3}P^{\circ} - 4p' \ ^{3}P \\ 4a \ ^{1}D - 4s' \ ^{1}P^{\circ} \\ 3a' \ ^{3}P^{\circ} - 4p' \ ^{3}P \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 - 0 \\ 0 - 1 \\ 2 - 1 \\ 2 - 1 \end{array} $
3135,906 3126,267 3096,826 3093,65 3093,424	$\begin{array}{c} 3 \\ 6 \\ 16 \\ 5 \\ 20 \end{array}$	26,81 26,80 17,72 17,72 17,72	30,76 30,76 21,72 21,73 21,73	$3d' ^3P^{\circ} - 4p' ^3P$ $3d' ^3P^{\circ} - 4p' ^3P$ $3d ^3D - 4p ^3P^{\circ}$ $3d ^3D - 4p ^3P^{\circ}$ $3d ^3D - 4p ^3P^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 1-0 \\ 1-1 \\ 2-1 \end{array} $
3086,46 3086,236 3083,363 3077,523 3068,238	$\begin{array}{c} 6 \\ 25 \\ 2 \\ 4 \\ 7 \end{array}$	17,72 17,72 26,82 26,81 26,80	21,74 21,74 30,84 30,84 30,84	$\begin{array}{c} 3d\ ^{3}D-4p\ ^{3}P^{\circ} \\ 3d\ ^{3}D-4p\ ^{3}P^{\circ} \\ 3d'\ ^{3}P^{\circ}-4p'\ ^{3}S \\ 3d'\ ^{3}P^{\circ}-4p'\ ^{3}S \\ 3d'\ ^{3}P^{\circ}-4p'\ ^{3}S \end{array}$	2—2 3—2 0—1 1—1 2—1
3046 ,284 3045 ,076 3043 ,932 3040 ,933 3037 ,287	3 5 7 9 8	24,99 24,99 24,99 25,98 25,98	29,06 29,06 29,06 30,06 30,06	$\begin{array}{c} 4d\ ^{3}D-6p\ ^{3}P^{\circ} \\ 4d\ ^{3}D-6p\ ^{3}P^{\circ} \\ 4d\ ^{3}D-6p\ ^{3}P^{\circ} \\ 4f\ ^{3}F^{\circ}-6g\ ^{3}G \\ 4f\ ^{3}F^{\circ}-6g\ ^{3}G \end{array}$	$ \begin{array}{c} 1 - 0 \\ 1, 2 - 1 \\ 3 - 2 \\ 4 - 4, 5 \\ 3 - 3, 4 \end{array} $
3034,732 3032,66 3013,091 2980,519 2959,67	6 4 5 5 3	25,97 26,65 26,65 17,72 26,65	30,06 30,74 30,76 21,88 30,84	4f ³ F°—6g ³ G 5p ³ P°—4p' ³ P 5p ³ P°—4p' ³ P 3d ³ D—4p ¹ P° 5p ³ P°—4p' ³ S	2-3 2-1 2-2 2-1 0, 1-1
2959,150 2875,09 2874,626 2839,622 2831,490	5 2 4 5 7	26,65 26,65 26,65 25,97 25,98	30,84 30,96 30,96 30,34 30,35	5p ³ P°—4p' ³ S 5p ³ P°—8s ³ S 5p ³ P°—8s ³ S 4f ³ F°—4p' ³ D 4f ³ F°—4p' ³ D	$ \begin{array}{c} 2-1 \\ 0, 1-1 \\ 2-1 \\ 2-1 \\ 3-2 \end{array} $
2817,110 2655,512 2640,788 2559,210 2546,093	9 14 11 14 10	25,98 25,39 25,42 20,55 20,55	30,38 30,06 30,11 25,39 25,42	$\begin{array}{c} 4f {}^{3}F^{\circ} - 4p' {}^{3}D \\ 4f {}^{1}F^{\circ} - 6g {}^{1}G \\ 3d' {}^{1}D^{\circ} - 4p' {}^{1}P \\ 3d {}^{1}D - 4f {}^{1}F^{\circ} \\ 3d {}^{1}D - 3d' {}^{1}D^{\circ} \end{array}$	4—3 3—4 2—1 2—3 2—2
2541 ,818 2483 ,196 2481 ,508 2449 ,484 2429 ,35	25 6 3 11 7	10,28 25,98 25,97 24,99 24,69	15,15 30,97 30,97 30,05 29,79	$3p^{1}P^{\circ}-3p^{2}^{1}D$ $4f^{3}F^{\circ}-7g^{3}G$ $4f^{3}F^{\circ}-7g^{3}G$ $4d^{3}D-6f^{3}F^{\circ}$ $3d'^{3}F^{\circ}-6d^{3}D$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 2-3 \\ - \\ 4-3 \\ 2-2 \end{array} $
2329,931 2308,491 2306,42 2300,930 22 96,873	2 10 2 8 10	25,42 24,69 24,99 24,67 29,18	30,73 30,06 30,36 30,06 34,58	$3d' ^{1}D^{\circ} - 4p' ^{1}D$ $3d' ^{3}F^{\circ} - 6g ^{3}G$ $4d ^{3}D - 7p ^{3}P^{\circ}$ $3d' ^{3}F^{\circ} - 6g ^{3}G$ $3d' ^{1}F^{\circ} - 4f' [3^{1}/_{2}]$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Λ	1	E_{H} , eV	$E_{ m B},~{ m eV}$	Transition	J
2295,476 2222,01 2182,049 2180,836 2176,894	6 2 3 4 5	24,66 25,39 24,66 24,67 24,69	30,06 30,97 30,34 30,35 30,38	$3d' \ ^{3}F^{\circ}-6g \ ^{3}G$ $4f \ ^{1}F^{\circ}-7g \ ^{1}G$ $3d' \ ^{3}F^{\circ}-4p' \ ^{3}D$ $3d' \ ^{3}F^{\circ}-4p' \ ^{3}D$ $3d' \ ^{3}F^{\circ}-4p' \ ^{3}D$	2-3 3-4 2-1 3-2 4-3
2157,280 2075,04 2049,913 1892,030 1842,547	2 2 2 3 9	29,25 24,99 20,55 0,00 15,15	34,99 30,96 26,59 6,55 21,88	$4s' ^{1}P^{\circ} - 5p' ^{1}P$ $4d ^{3}D - 7f ^{3}F^{\circ}$ $3d ^{1}D - 5p ^{1}P^{\circ}$ $3s^{2} ^{1}S - 3p ^{3}P^{\circ}$ $3p^{2} ^{1}D - 4p ^{1}P^{\circ}$	1—1 — 2—1 0—1 2—1
1803,023 1709,018 1699,808 1673,315 1588,950	3 3 5 7 2	19,72 — 20,55 20,55	26,59 — 27,96 28,35	$4s {}^{1}S - 5p {}^{1}P^{\circ}$ $ 3d {}^{1}D - 5f {}^{1}F^{\circ}$ $3d {}^{1}D - 3d' {}^{1}P^{\circ}$	0—1 — — 2—3 2—1
1513,533 1506,060 1501,870 1501,191 1500,241	$\begin{array}{c} 2 \\ 6 \\ 9 \\ 10 \\ 12 \end{array}$	29,18 21,88 17,72 17,72 17,72	37,37 30,11 25,97 25,98 25,98	$\begin{array}{c} 3d' {}^{1}F^{\circ} - 5f' [3^{1}/_{2}] \\ 4p {}^{1}P^{\circ} - 4p' {}^{1}P \\ 3d {}^{3}D - 4f {}^{3}F^{\circ} \\ 3d {}^{3}D - 4f {}^{3}F^{\circ} \\ 3d {}^{3}D - 4f {}^{3}F^{\circ} \end{array}$	$ \begin{array}{c} 3-3\\ 1-1\\ 1, 2, 3-2\\ 2, 3-3\\ 3-4 \end{array} $
1496 ,172 1457 ,253 1447 ,196 1441 ,732 1439 ,391	7 5 6 5 2	20,55 6,59 6,55 21,73	29,05 15,15 15,15 30,34	$\begin{array}{c} - \\ 3d ^{1}D - 6p ^{1}P^{\circ} \\ 3p ^{3}P^{\circ} - 3p^{2} ^{1}D \\ 3p ^{3}P^{\circ} - 3p^{2} ^{1}D \\ 4p ^{3}P^{\circ} - 4p' ^{3}D \end{array}$	$\begin{array}{c} - \\ 2-1 \\ 2-2 \\ 1-2 \\ 1-1 \end{array}$
1438,702 1438,228 1436,724 1436,166 1435,776	2 2 4 7 8	21 ,72 21 ,73 21 ,73 19 ,72 20 ,55	30,34 30,35 30,35 28,35 29,18	$4p \ ^{3}P^{\circ} - 4p' \ ^{3}D$ $4p \ ^{3}P^{\circ} - 4p' \ ^{3}D$ $4p \ ^{3}P^{\circ} - 4p' \ ^{3}D$ $4s \ ^{1}S - 3d' \ ^{1}P^{\circ}$ $3d \ ^{1}D - 3d' \ ^{1}F^{\circ}$	0-1 $2-2$ $1-2$ $0-1$ $2-3$
1433,690 1424,775 1417,237 1387,994 1377,238	6 2 13 5 2	21,74 20,55 10,28 17,72 21,73	30,38 29,25 19,02 26,65 30,73	$4p \ ^{3}P^{\circ}-4p' \ ^{3}D$ $3d \ ^{1}D-4s' \ ^{1}P^{\circ}$ $3p \ ^{1}P^{\circ}-3p^{2} \ ^{1}S$ $3d \ ^{3}D-5p \ ^{3}P^{\circ}$ $4p \ ^{3}P^{\circ}-4p' \ ^{3}P$	2-3 2-1 1-0 - 1-0
1377,082 1375,688 1375,083 1373,030 1371,652	3 2 2 5 3	21,74 21,73 21,72 21,74 21,73	30 ,74 30 ,74 30 ,74 30 ,76 30 ,76	$4p \ ^{3}P^{\circ}-4p' \ ^{3}P$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 0-1 \\ 2-2 \\ 1-2 \end{array} $
1369,437 1367,049 1365,253 1363,459 1362,366	5 7 8 7 5	19,01 19,01 17,72 17,72 17,72	28,06 28,08 26,80 26,81 26,82	4s 3S-4s' 3P° 4s 3S-4s' 3P° 3d 3D-3d' 3P° 3d 3D-3d' 3P° 3d 3D-3d' 3P°	$ \begin{array}{c} 1 - 0 \\ 1 - 1 \\ 1, 2, 3 - 2 \\ 1, 2 - 1 \\ 1 - 0 \end{array} $
1361,597 1343,388 1342,392 1341,465 1313,867	8 6 7 8 3	19,01 17,72 17,72 17,72	28,12 26,95 26,95 26,96	4s ³ S-4s' ³ P° 3d ³ D-3d' ³ D° 3d ³ D-3d' ³ D° 3d ³ D-3d' ³ D°	$ \begin{array}{c} 1-2\\ 1, 2-1\\ 4, 2, 3-2\\ 2, 3-3 \end{array} $
1312,590 1303,320 1301,146 1298,960 1298,891	13 16 14 18 15	10,28 6,59 6,55 6,59 6,55	19,72 16,10 16,08 16,13 16,10	$3p ^{1}P^{\circ}-4s ^{1}S$ $3p ^{3}P^{\circ}-3p^{2} ^{3}P$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 1 - 0 \\ 2 - 2 \\ 1 - 1 \end{array} $
1296,726 1294,543 1280,354	14 17 6	6,54 6,55 20,55	16,10 16,13 30,23	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3d \ ^{1}D - 6f \ ^{1}F^{\circ}$	0-1 $1-2$ $2-3$

λ, λ	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
		Эн, от	B, C,		
431, 1235 1212, 1210	$\frac{7}{2}$	$19,02 \\ 19,02$	$29,05 \\ 29,25$	$3p^{2} {}^{1}S - 6p {}^{1}P^{\circ} \ 3p^{2} {}^{1}S - 4s' {}^{1}P^{\circ}$	0—1 0—1
1240 ,456 1207 ,517	$^{10}_{9}$	15,15 15,15	25,39 25,42	$\frac{3p^2}{3p^2} \frac{1}{1}D - 4f \frac{1}{4}F^{\circ}$ $\frac{3p^2}{1}D - 3d' \frac{1}{4}D^{\circ}$	2—3 2—2
1206,533 1206,510	$\frac{30}{30}$	10,28 0,00	$20,55 \\ 10,27$	$3p {}^{1}P^{\circ} - 3d {}^{1}D$ $3s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$	$\begin{array}{c} 1-2 \\ 0-1 \end{array}$
1182,018	3	20,55	31,04	$3d {}^{1}D - 7f {}^{1}F^{\circ}$	2—3
1178,004 1174,432	8 6	16,13 16,10	26,65 26,65	$3p^2 \ ^3P - 5p \ ^3P^\circ \ 3p^2 \ ^3P - 5p \ ^3P^\circ \ $	$\begin{array}{c} 2-1,\ 2\\ 1-2\\ \end{array}$
1174,369 1172,529	5 4	16,10 16,08	26,65 $26,65$	$3p^{2} \ ^{3}P - 5p \ ^{3}P^{\circ}$ $3p^{2} \ ^{3}P - 5p \ ^{3}P^{\circ}$ $3p^{2} \ ^{3}P - 5p \ ^{3}P^{\circ}$	1—0, 1 0—1 2—2
1161,579 1160,255	8 6	16,13 16,13	26,80 26,81	$3p^2 \ ^3P - 3d' \ ^3P^\circ \ 3p^2 \ ^3P - 3a' \ ^3P^\circ$	2—1
1158 ,102 1156 ,782	7 4	$16,10 \\ 16,10$	$26,80 \\ 26,81$	$3p^2 \ ^3P - 3d' \ ^3P^{\circ} \ 3p^2 \ ^3P - 3d' \ ^3P^{\circ}$	$\begin{array}{c} 1-2 \\ 1-1 \end{array}$
1155 ,957 1154 ,998	$\frac{6}{6}$	$16,10 \\ 16,08$	$26,82 \\ 26,81$	$\frac{3p^2}{3p^2}\frac{3P}{3P} - \frac{3d'}{3l'}\frac{3P^{\circ}}{3P^{\circ}}$	1—0 0—1
1145,22	8	17,72 $17,72$	$28,54 \\ 28,54$	$3d\ ^{3}D - 5f\ ^{3}F^{\circ} \ 3d\ ^{3}D - 5f\ ^{3}F^{\circ}$	3—3, 4 1, 2, 3—2
1145,177 1144,959	7 6	17,72 16,13	$28,54 \\ 26,95$	$\frac{3d}{3p} \frac{^{3}D}{^{5}f} \frac{^{3}F^{\circ}}{^{3}D}$	2—3 2—2
1144,306 1142,282	$\frac{8}{6}$	16,13 16,10	$26,96 \\ 26,95$	$\frac{3p^2}{3p^2}\frac{^3P}{^3P} - 3d'\frac{^3D}{^3D}$ °	$\begin{array}{c} 2-3 \\ 1-1 \end{array}$
1141,580 1140,545	7 6	16,10 16,08	$26,95 \\ 26,95$	$\frac{3p^2}{3p} \frac{^3P}{^3P} - \frac{3d'}{^3D} \frac{^3D}{^3D}$	$\begin{array}{c} 1-2 \\ 0-1 \end{array}$
1117,686 1113,228 1109,970	4 18 16	6,59 6,55	17 ,72 17 ,72	$\begin{array}{c} - \\ 3p \ ^3P^{\circ} - 3d \ ^3D \\ 3p \ ^3P^{\circ} - 3d \ ^3D \end{array}$	2—1, 2, 3 1—1, 2
1108,368 1083,210	14 6	$\substack{6,54\\15,15}$	$17,72 \\ 26,59$	$\frac{3p}{3p^2} P^{\circ} - 3d {}^{3}D - 5p {}^{1}P^{\circ}$	0—1 2—1
1076,210 1079,112 1076,589	4 10	— —			
1076,253	3	_	_	_	_
1053,289 1037,053	10 7	16,13	28,08	$\begin{array}{c} - \\ 3p^2 \ ^3P - 4s' \ ^3P^\circ \\ 3p^2 \ ^3P - 4s' \ ^3P^\circ \end{array}$	2—1 1—0
1035,657 1034,287	3 4 8	16,10 16,10 16,13	28,06 28,08 28,12	$3p^{2} ^{3}P - 4s' ^{3}P^{\circ} \ 3p^{2} ^{3}P - 4s' ^{3}P^{\circ} \ 3p^{2} ^{3}P - 4s' ^{3}P^{\circ}$	$\begin{array}{c} 1-0 \\ 1-1 \\ 2-2 \end{array}$
1033,920 1032,851	3	16,08	28,08	$3p^2 ^3P - 4s' ^3P^{\circ}$	0—1
1031,169 1005,365	7 7	16,10 $17,72$	28,12 30,05	$3p^{2} ^{3}P - 4s' ^{3}P^{\circ} \ 3d ^{3}D - 6f ^{3}F^{\circ} \ 3p ^{3}P^{\circ} - 4s ^{3}S$	$ \begin{array}{c} 1-2 \\ - \\ 2-1 \end{array} $
997,389 994,787	16 13	$^{6,59}_{6,55}$	19,01 19,01	3p 3P -4s 3S	· 2—1 1—1
993,519 967,946	10 9	6,54 15,15	$19,01 \\ 27,96$	$3p ^3P^{\circ}$ —4s 3S $3p^2 ^1D$ —5f $^1F^{\circ}$	$0-1 \\ 2-3$
939,093 936,060	$\frac{7}{3}$	15,15 17,72	$28,35 \\ 30,96$	$3p^{2} ^{1}D - 3d' ^{1}P^{\circ} \ 3d ^{3}D - 7f ^{3}F^{\circ}$	2—1
883,398	5	15,15	29,18	$3p^{2} {}^{1}D - 3d' {}^{1}F^{\circ}$ $3p {}^{1}P^{\circ} - 4d {}^{1}D$	2—3 1—2
823,408 800,066 690,689	$\begin{array}{c} 9 \\ 5 \\ 2 \end{array}$	10,28 $10,28$ $10,28$	25,33 $25,77$ $28,22$	$3p ^{1}P^{\circ} - 5s ^{1}S$ $3p ^{1}P^{\circ} - 5d ^{1}D$	$\begin{array}{c} 1 - 2 \\ 1 - 0 \\ 1 - 2 \end{array}$
678,055 678,477	2 5	$10,28 \\ 6,59$	28,56 24,99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
672,293	4	6,55	24,99	$3p \ ^3P^{\circ}-4d \ ^3D$	1—1, 2 0—1
671,718 653,332	$\frac{2}{8}$	$6,54 \\ 6,59 \\ 6,55$	24,99 $25,56$ $25,56$	$3p \ ^{3}P^{\circ}-4d \ ^{3}D$ $3p \ ^{3}P^{\circ}-5s \ ^{3}S$ $3p \ ^{3}P^{\circ}-5s \ ^{3}S$	$ \begin{array}{c} 0-1 \\ 2-1 \\ 1-1 \end{array} $
652,223 651,668	4	6,55 $6,54$	25,56	$3p$ ^{3}P ° $-5s$ ^{3}S	0-1

_	λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
	566,613	8	0,00	21,88	$3s^{2} {}^{1}S - 4p {}^{1}P^{\circ}$	0-1
	565,698	2	6,55	28,46	$3p {}^{3}P^{\circ} - 6s {}^{3}S$	1-1
	565,289	1	6,54	28,46	$3p {}^{3}P^{\circ} - 6s {}^{3}S$	0-1
	466,129	4	0,00	26,59	$3s^{2} {}^{1}S - 5p {}^{1}P^{\circ}$	0-1

Si IV, ground state $1s^2 2s^2 2p^6 3s^2 S_{1/2}$ Ionization potential 364 093,1 cm⁻¹; 45,139 eV

λ, Â	I	E _H , eV	$E_{_{ m B}},{ m eV}$	Transition	J
9018,162 8957,245 8240,606 7752,905 7730,469	1 2 1 1	32,90 32,90 39,08 39,09 39,09	34,28 34,29 40,59 40,69 40,69	$5s ^2S - 5p ^2P^{\circ}$ $5s ^2S - 5p ^2P^{\circ}$ $6f ^2F^{\circ} - 7d ^2D$ $6g ^2G - 7f ^2F^{\circ}$ $6h ^2H^{\circ} - 7g ^2G$	1/2 ⁻¹ / ₂ 1/ ₂ 3/ ₂
7725 ,64 7723 ,818 7718 ,785 7678 ,748 7654 ,555	2 6 5 4 4	39,09 39,09 39,09 39,08 37,90	40,70 40,70 40,70 40,69 39,52	$6h\ ^{2}H^{\circ}-7h\ ^{2}H^{\circ} \ 6h\ ^{2}H^{\circ}-7i\ ^{2}I \ 6g\ ^{2}G-7h\ ^{2}H^{\circ} \ 6f\ ^{2}F^{\circ}-7g\ ^{2}G \ 6p\ ^{2}P^{\circ}-7s\ ^{2}S$	- - - - 3/ ₂ ¹ / ₂
7630,497 7068,410 7047,939 6998,358 6701,207	2 4 6 3 7	37,89 36,14 38,92 34,29	39,52 37,89 37,90 40,69 36,14	$6p ^{2}P^{\circ}$ —7s ^{2}S $5d ^{2}D$ — $6p ^{2}P^{\circ}$ $5d ^{2}D$ — $6p ^{2}P^{\circ}$ $6d ^{2}D$ —7f $^{2}F^{\circ}$ $5p ^{2}P^{\circ}$ — $5d ^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2, 5/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2, 5/2 \end{array} $
6667,556 5309,493 5304,971 4950,105 4673,297	5 1 2 3 2	34,28 38,92 38,92 36,41 36,43	36,14 41,25 41,25 38,92 39,08	$5p \ ^2P^{\circ} - 5d \ ^2D \ 6d \ ^2D - 8p \ ^2P^{\circ} \ 6d \ ^2D - 8p \ ^2P^{\circ} \ 5f \ ^2F^{\circ} - 6d \ ^2D \ 5g \ ^2G - 6f \ ^2F^{\circ}$	$^{1/2}_{2}$ $^{3/2}_{2}$ $^{1/2}_{1/2}$ $^{3/2}_{2}$ $^{5/2}$ $^{3/2}_{2}$ $^{-3/2}_{2}$
4667,14 4656,92 4654,323 4647,45 4631,241	1 3 10 1 9	39,08 36,43 36,43 36,41 36,41	41,74 39,09 39,09 39,08 39,09	$6f ^2F^{\circ} - 8g ^2G$ $5g ^2G - 6g ^2G$ $5g ^2G - 6h ^2H^{\circ}$ $5f ^2F^{\circ} - 6f ^2F^{\circ}$ $5f ^2F^{\circ} - 6g ^2G$	-
4628,62 4611,27 4411,652 4403,734 4328,175	3 0 0 2 5	36,41 37,90 37,15 38,92 34,29	39,09 40,59 39,96 41,73 37,15	$5f\ ^2F^\circ-6h\ ^2H^\circ \ 6p\ ^2P^\circ-7d\ ^2D \ 6s\ ^2S-7p\ ^2P^\circ \ 6d\ ^2D-8f\ ^2F^\circ \ 5p\ ^2P^\circ-6s\ ^2S$	$\begin{array}{c} - \\ 3/_2 - 5/_2, \ 3/_2 \\ 1/_2 - 3/_2 \\ - \\ 3/_2 - 1/_2 \end{array}$
4314,104 4212,407 4116,097 4088,854 4038,057	$\begin{array}{c} 3 \\ 7 \\ 9 \\ 10 \\ 2 \end{array}$	34,28 36,14 24,05 24,05 37,90	37,15 39,08 27,06 27,08 40,97	$5p^{2}P^{\circ}$ -6s ^{2}S $5d^{2}D$ -6f $^{2}F^{\circ}$ $4s^{2}S$ -4p $^{2}P^{\circ}$ $4s^{2}S$ -4p $^{2}P^{\circ}$ $6p^{2}P^{\circ}$ -8s ^{2}S	$\begin{array}{c} {}^{1/2}-{}^{1/2} \\ - \\ {}^{1/2}-{}^{1/2} \\ {}^{1/2}-{}^{3/2} \\ {}^{3/2}-{}^{1/2} \end{array}$
4031,39 3773,151 3762,435 3244,192 3165,710	1 6 8 1 9	37,89 31,00 31,00 36,14 27,08	40,97 34,28 34,29 39,96 31,00	$6p\ ^2P^{\circ}-8s\ ^2S \ 4d\ ^2D-5p\ ^2P^{\circ} \ 4d\ ^2D-5p\ ^2P^{\circ} \ 5d\ ^2D-7p\ ^2P^{\circ} \ 4p\ ^2P^{\circ}-4d\ ^2D$	$\begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
3149,561 2971,522 2904,470 2895,131 2723,812	7 1 2 3 3	27,06 36,41 36,43 36,41 36,14	31,00 40,59 40,70 40,69 40,69	$4p^{2}P^{\circ}-4d^{2}D$ $5f^{2}F^{\circ}-7d^{2}D$ $5g^{2}G-7h^{2}H^{\circ}$ $5f^{2}F^{\circ}-7g^{2}G$ $5d^{2}D-7f^{2}F^{\circ}$	1/ ₂ —3/ ₂ ————————————————————————————————————
294			•	– •,, •	_

λ, Å	I	$E_{ m H},~{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
2677,57 2675,249 2675,120 2672,193 2517,506	1 4 4 1 7	34,29 31,51 31,51 34,28 31,51	38,92 36,14 36,14 38,92 36,43	$5p ^2P^{\circ} - 6d ^2D$ $4f ^2F^{\circ} - 5d ^2D$ $4f ^2F^{\circ} - 5d ^2D$ $5p ^2P^{\circ} - 6d ^2D$ $4f ^2F^{\circ} - 5g ^2G$	$ \frac{3}{2} - \frac{5}{2}, \frac{3}{2} $ $ \frac{7}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{3}{2}, \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $
2485,378 2482,816 2370,985 2366,755 2328,56	1 2 3 2 2	32,90 32,90 34,29 34,28 36,41	37,89 37,90 39,52 39,52 41,74	$5s^{2}S-6p^{2}P$ $5s^{2}S-6p^{2}P$ $5p^{2}P^{\circ}-7s^{2}S$ $5p^{2}P^{\circ}-7s^{2}S$ $5f^{2}F^{\circ}-8g^{2}G$	$\begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ - \end{array}$
2287,041 2127,467 2120,179 1729,997 1727,377	5 4 3 5 5	31,00 27,08 27,06 - 19,88	36,41 32,90 32,90 - 27,06	$\begin{array}{c} 4d\ ^{2}D-5f\ ^{2}F^{\circ} \\ 4p\ ^{2}P^{\circ}-5s\ ^{2}S \\ 4p\ ^{2}P^{\circ}-5s\ ^{2}S \\ \\ 3d\ ^{2}D-4p\ ^{2}P^{\circ} \end{array}$	$\begin{array}{c} - \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ - \\ 3/2 - 1/2 \end{array}$
1726,006 1722,534 1673,374 1642,168 1634,607	$\begin{array}{c} 4 \\ 6 \\ 150 \\ 4 \\ 1 \end{array}$	19,88 — 31,51	27,08 - 39.09	3d ² D—4p ² P° — — — — 4f ² F°—6g ² G	3/ ₂ , 5/ ₂ —3/ ₂ — — —
1430,794 1410,950 1407,701 1402,760 1393,755	1 1 3 12 15	 0,00 0,00	8.84 8,90		$\begin{array}{c} - \\ - \\ - \\ 1/_2 - 1/_2 \\ 1/_2 - 3/_2 \end{array}$
1291,969 1280,336 1128,340 1128,325 1122,485	30 20 10 10 8		 19,88 19,88 19,88	$\begin{array}{c} - \\ - \\ 3p ^2P ^{\circ} - 3d ^2D \\ 3p ^2P ^{\circ} - 3d ^2D \\ 3p ^2P ^{\circ} - 3d ^2D \end{array}$	$\begin{array}{c} - \\ - \\ 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \end{array}$
1117,990 1100,050 1098,408 1077,325 1066,650	4 1 1 1 3			3d 2D-4f 2F°	- - - 3/ ₂ ⁵ / ₂
1066,636 1066,614 1056,582 1051,596 984,889	8 8 12 70 1	19,88 19,88 — — —	31,51 31,51 — — —	3d ² D-4f ² F° 3d ² D-4f ² F° - - -	5/2—5/2 5/2—7/2 — —
933,420 894,347 854,789 849,248 840,901	5 3 7 1 5	 		— 	— — — —
836, 126 818, 129 815, 049 749, 941 730, 241	1 8 7 5 2	8,90 8,84 19,88	24,05 24,05 36,41	$3p\ ^{2}P^{\circ}-4s\ ^{2}S \ 3p\ ^{2}P^{\circ}-4s\ ^{2}S \ 3d\ ^{2}D-5f\ ^{2}F^{\circ} \ -$	$\begin{array}{c}$
712,688 688,935 683,568 683,135 681,911	1 2 1 1	 	 		
680,679 676,981 671,354	1 1 5	<u> </u>	=	= =	— — —

λ, Å	I	E_{H} , eV	$E_{ m B},\;{ m eV}$	Transition	J
659,854	1	_	_		_
645,764	2	19,88	39,08	$3d$ 2D — $6f$ $^2F^\circ$	-
639,208	1	_		_	_
635,312	10	_	_	_	_
633,183	3		-	-	-
629,750	2	_		_	-
629,363	2			_	
612,082	2	_	_	_	_
608,904	$\overline{1}$	_	_	_	_
561,689	1	_		_	_
542,296	5	_	_	-	
516,348	3	8,90	32,90	$3p^{-2}P^{\circ}$ — $5s^{-2}S$	$^{3}/_{2}$ — $^{1}/_{2}$
515,118	2	8,84	32,90	$3p^{-2}P^{\circ}$ —5s ${}^{2}S$	$^{1}/_{2}$ — $^{1}/_{2}$
458,155	$\bar{3}$	0,00	27,06	$3s^{2}S - 4p^{2}P^{\circ}$	$\frac{1}{2}$ _1/2
457,818	4	0,00	27,08	$3s {}^{2}S - 4p {}^{2}P^{\circ}$	$\frac{1}{2} - \frac{3}{2}$

Si V, ground state $1s^2 2s^2 2p^{61}S_0$ Ionization potential 1345 100 cm⁻¹; 166,762 eV

λ, Ά	I	$E_{ m H}$, eV	E _B , eV	Transition	J
118,968	20	0,00	104,21	$\begin{array}{c} 2p^{6} {}^{1}S - 3s {}^{1}{}^{1/2} {}^{\circ} \\ 2p^{6} {}^{1}S - 3s' {}^{1/2} {}^{\circ} \\ 2p^{6} {}^{1}S - 3d {}^{1/2} {}^{\circ} \\ 2p^{6} {}^{1}S - 3d {}^{1/2} {}^{\circ} \\ 2p^{6} {}^{1}S - 3d {}^{1/2} {}^{\circ} \\ 2p^{6} {}^{1}S - 3d' {}^{1}{}^{1/2} {}^{\circ} \end{array}$	0—1
117,860	20	0,00	105,19		0—1
98,209	2	0,00	126,24		0—1
97,143	10	0,00	127,62		0—1
96,439	15	0,00	128,56		0—1
90,852	4	00,00	136,46	$2p^{6} {}^{1}S - 4s [1^{1}/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 4s' [1^{1}/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 4d [1^{1}/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 4d' [1^{1}/_{2}]^{\circ}$ $2p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ}$	0—1
90,453	4	00,00	137,06		0—1
85,576	6	0,00	144,87		0—1
85,175	10	0,00	145,56		0—1
81,113	2	0,00	152,85		0—1
80,807	2	00, 00	153,42	$2p^{6} {}^{1}S - 5d' [1^{1}/_{2}]^{\circ}$	0—1
78,903	1	00, 00	157,13	$2p^{6} {}^{1}S - 6d [1^{1}/_{2}]^{\circ}$	0—1
78,611	1	00, 0	157,71	$2p^{6} {}^{1}S - 6d' [1^{1}/_{2}]^{\circ}$	0—1

Si VI, ground state $1s^2 \, 2s^2 \, 2p^{5 \, 2} P^0_{\, 3/2}$ Ionization potential $1\, 654\, 800$ cm $^{-1}$; 205,157 eV

λ, Å	I	$E_{ m H},~{ m eV}$	E_{B} , eV	Transition	J
249,125	8	0,63	50,40	$2p^5 \ ^2P^{\circ} - 2p^6 \ ^2S$	1/2-1/2
246,001	8	00,00	50,40	$2p^{5} \ ^{2}P^{\circ} - 2p^{6} \ ^{2}S$	3/2 - 1/2
103,163	2	50,40	170,57	$2p^{6} {}^{2}S - 3s^{"2}P^{\circ}$	1/2 - 3/2
102,846	1	50,40	170,94	$2p^{6} 2S - 3s'''^{2}P^{\circ}$	$\frac{1}{2}$ _1/2
101,160	0	0,63	123,19	$2p^{5} \ ^{2}P^{\circ} - 3s \ ^{4}P$	$\frac{1}{2} - \frac{3}{2}$
100,963	1	0,00	122,79	$2p^{5} {}^{2}P^{\circ} - 3s {}^{4}P$	$^{3}/_{2}$ — $^{5}/_{2}$
640,640	10	0,00	123,19	$2p^{5} 2P^{\circ} - 3s^{4}P$	$\frac{3}{2}$ $\frac{3}{2}$
99,966	10	0,63	124,65	$2p^{5} 2P^{\circ} - 3s^{2}P$	1/2 - 3/2
99,598	10	63, 0	125,11	$2p^{5} 2P^{\circ} - 3s^{2}P$	1/2 - 1/2
99,460	15	00,00	124,65	$2p^{5} 2P^{\circ} - 3s^{2}P$	3/2 $-3/2$

λ, Λ	I	E _H eV	E _B , eV	Transition	J
99,095 96,488 96,020 91,798 91,369	10 10 10 4 4	0,00 0,63 0,00 0,63 0,00	125,11 129,12 129,12 135,69 135,69	$2p^{5} {}^{2}P^{\circ} - 3s {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3s {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3s {}'' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 3s {}'' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 3s {}'' {}^{2}S$	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2, & 5/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
84,082 83,965 83,802 83,729 83,684	12 0 6 1 1	0,63 0,63 0,00 0,00 0,00	148,07 148,28 147,94 148,07 148,15	$2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}F$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}P$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}F$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}F$ $2p^{5} \ ^{2}P^{\circ}$ — $3d \ ^{4}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
83,639 83,611 83,526 83,358 83,283	3 8 8 8 1	$ \begin{array}{c} 0,63 \\ 0,00 \\ 0,63 \\ 0,00 \\ 0,63 \\ 0,00 \\ \end{array} $	148,86 148,28 148,91 148,43 149,36 148,86	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
83,258 83,128 83,006 81,030 80,908	5 15 4 7 8	0,00 0,00 0,00 0,63 0,63	148,91 149,14 149,36 153,63 153,86	$2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$	3/2 $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $1/2$ $1/2$ $1/2$
80,821 80,725 80,698 80,577 80,501	8 10 10 12 10	0,63 0,63 0,00 0,00 0,00	154,03 154,21 153,63 153,86 154,01	$2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}D$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}P$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}S$ $2p^{5} \ ^{2}P^{\circ} - 3d' \ ^{2}D$	$^{1/2}$ _{2}_{1/2}_{3/2} $^{1/2}$ _{3/2}_{2}_{1/2} $^{3/2}$ _{1/2}_{3/2}_{5/2}_{5/2}
80,491 80,449 80,395 77,718 77,429	5 10 5 6 10	0,00 0,00 0,00 0,63 0,00	154,03 154,11 154,21 160,15 160,12	$2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}F$ $2p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
75,587 75,486 75,193 72,896 71,718	1 1 4 1 0	0,00 0,63 0,00 0,00 0,63	164,02 164,88 164,88 170,07 173,50	$2p^{5} {}^{2}P^{\circ}$ — $4s {}^{4}P$ $2p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4s' {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}F$	3/2 $3/2$ $1/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$
71,644 71,561 71,534 71,474 71,384	0 1 1 1 4	0,63 0,63 0,63 0,00 0,00	173,68 173,88 173,95 173,46 173,68	$2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}F$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}P$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
71,366 71,340 71,304 71,273 71,181	3 1 0 2 5	0,63 0,00 0,00 0,00 0,00	174,35 173,78 173,88 173,95 174,17	$2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{4}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $2p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
69,448 69,421 69,236 69,204 66,796	$\begin{array}{c} 2 \\ 1 \\ 5 \\ 1 \\ 0 \end{array}$	0,63 0,63 0,00 0,00 0,00	179,15 179,22 179,07 179,15 185,61	$2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}S$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$	$\begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array}$
66,772 65,211 65 ,004	0 0 0	0,00 0,63 0,00	185,67 190,75 190,72	$2p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$ $2p^{5} {}^{2}P^{\circ} - 5d' {}^{2}P$ $2p^{5} {}^{2}P^{\circ} - 5d' {}^{2}S$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $

CHLORINE, Z = 17

Cl I, ground state $1s^2 2s^2 2p^6 3s^2 3p^{5 2}P_{3/2}^0$ Ionization potential 107 995,46 cm⁻¹; 13,017 eV

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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
25323,66 25047,31 24470,02 24146,23 23956,10	6 6 100 4 11	10,43 10,40	10,92 10,90	$4p ^4D^{\circ} - 3d ^4D$ $- 3d ^4D$ $- 3d ^4D$ $ 3d ^4D$	5/2—5/2 — 7/2—7/2 —
23882,69 23188,84 23038,78 22891,90 22721,74	18 12 17 4 5	10,40 11,29 11,22 —	10,92 11,83 11,76	4p 4D°—3d 4D 3d 2F—5p 2D° 3d 4F—5p 4D° —	7/2— $5/2$ $7/2$ — $5/2$ $7/2$ — $5/2$ $-$ —
22688,70 22522,80 22288,52 22026,68 21902,34	12 6 9 40 14	11,39 11,30 11,18 11,25	11,94 11,85 11,74 11,82	$3d\ ^{2}P$ — $5p\ ^{2}P^{\circ}$ — $5s\ ^{4}P$ — $5p\ ^{4}S^{\circ}$ $3d\ ^{4}F$ — $5p\ ^{4}D^{\circ}$ $3d\ ^{4}F$ — $5p\ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ - \\ 5/2 - 3/2 \\ 9/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
21830,38 21582,40 20725,44 20370,12 20199,36	10 12 56 85 227	11,30 11,37 10,33 10,33 10,31	11,86 11,94 10,93 10,94 10,92	$5s \stackrel{4}{P} - 5p \stackrel{2}{P}^{\circ}$ $3d \stackrel{4}{P} - 5p \stackrel{2}{P}^{\circ}$ $4p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{P}$ $4p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{P}$ $4p \stackrel{4}{P}^{\circ} - 3d \stackrel{4}{P}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
19766,78 19755,28 19443,27 19370,30 18971,55	185 717 6 227 21	10,31 10,28 10,31 10,28 10,28	10,93 10,90 10,94 10,92 10,93	$4p ^4P^{\circ} - 3d ^4D$ $4p ^4P^{\circ} - 3d ^4D$ $4p ^4P^{\circ} - 3d ^4D$ $4p ^4P^{\circ} - 3d ^4D$ $4p ^4P^{\circ} - 3d ^4D$	3/2 $-3/2$ $5/2$ $-7/2$ $3/2$ $-1/2$ $5/2$ $-5/2$ $5/2$ $-3/2$
18742,79 18541,37 18382,27 17825,76 17767,65	22 74 40 5 7	10,63 10,63 10,63 10,63 10,59	11,29 11,30 11,30 11,32 11,29	4p 4S°—5s 4P 4p 4S°—5s 4P 4p 4S°—5s 4P 4p 4S°—3d 2D 4p 2P°—5s 4P	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array}$
17586,44 17519,72 17443,93 17226,30 17119,13	60 4 46 27 28	10,59 10,59 10,63 10,49	11,30 11,30 11,35 11,22	$4p ^{2}P^{\circ} - 5s ^{4}P$ $- 4p ^{2}P^{\circ} - 5s ^{4}P$ $4p ^{4}S^{\circ} - 3d ^{2}D$ $4p ^{2}D^{\circ} - 3d ^{4}F$	3/2— $5/2— 3/2—3/23/2$ — $3/25/2$ — $7/2$
16941,45 16871,76 16813,82 16800,73 16759,73	10 18 14 10 6	10,59 10,63 10,63 —	11 ,32 11 ,36 11 ,37 —	4p ² P°—3d ² D 4p ⁴ S°—3d ⁴ P 4p ⁴ S°—3d ⁴ P ————————————————————————————————————	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
16671,38 16624,76	55 4	- 11,36		3d ⁴ P-(³ P ₂) 4f [3]°	$\frac{-}{\frac{5}{2}-\frac{5}{2}}, \frac{7}{2}$
16385,70 16293,39 16286,18	7 15 39	$ \begin{cases} 10,54 \\ 10,49 \\ 11,35 \\ 10,54 \end{cases} $	11,29 11,25 12,11 11,30	$4p ^{2}D^{\circ} - 3d ^{2}F$ $4p ^{2}D^{\circ} - 3d ^{4}F$ $3d ^{2}D - (^{3}P_{2}) 4f [3]^{\circ}$ $4p ^{2}D^{\circ} - 5s ^{4}P$	$ \begin{array}{c} 3/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
16284,18 16214,99 16198,47 16189,88 16179,12	7 10 259 14 10	11,35 11,35 10,63 11,35 11,43	12,11 12,11 11,39 12,12 12,20	$3d^{2}P$ — $(^{3}P_{2})$ $4f$ $[2]^{\circ}$ $3d^{2}D$ — $(^{3}P_{2})$ $4f$ $[2]^{\circ}$ $4p^{4}S^{\circ}$ — $3d^{2}P$ $3d^{2}P$ — $(^{3}P_{2})$ $4f$ $[1]^{\circ}$ $3d^{2}P$ — $(^{3}P_{1})$ $4f$ $[2]^{\circ}$	$\begin{array}{c} 3/2 - 3/2, & 5/2 \\ 3/2 - 5/2 & 3/2 - 3/2 \\ 3/2 - 3/2 & 3/2 - 3/2 \\ 1/2 - 3/2 & & \end{array}$
16077,62 16067,35 298	129 10	10,59 10,65	11 ,36 11 ,42	4p ² P°—3d ⁴ P 4p ² P°—5s ² P	$\frac{3}{2}$ $\frac{5}{2}$ _1 $\frac{5}{2}$ _2

λ, Å	I	$E_{_{ m H}}$, eV	$E_{ m B}^{},~{ m eV}$	Transition	J
16060 ,41 16024 ,95 15970 ,49	10 25 283	10,59 10,50	 11 ,37 11 ,28		$\frac{-}{3/2-3/2}$ $1/2-3/2$
15959,97 15928,92 15883,34 15869,66 15818,41	735 342 277 2780 193	10,47 10,65 10,57 10,40 10,54	11,25 11,43 11,35 11,18 11,32	$4p ^4D^{\circ}$ — $3d ^4F$ $4p ^2P^{\circ}$ — $3d ^2P$ $4p ^2S^{\circ}$ — $3d ^2D$ $4p ^4D^{\circ}$ — $3d ^4F$ $4p ^2D^{\circ}$ — $3d ^2F$	3/2 - 5/2 $ 1/2 - 1/2 $ $ 1/2 - 3/2 $ $ 7/2 - 9/2 $ $ 3/2 - 5/2$
15808,54 15792,00 15730,06 15717,70 15668,64	25 21 1487 4 7	11,32 11,32 10,43 11,32 10.50	12,11 12,11 11,22 12,11 11,29	$3d^{2}F$ — $(^{3}P_{2})$ $4f$ $[4]^{\circ}$ $3d^{2}F$ — $(^{3}P_{2})$ $4f$ $[3]^{\circ}$ $4p^{4}D^{\circ}$ — $3d^{4}F$ $3d^{2}F$ — $(^{3}P_{2})$ $4f$ $[2]^{\circ}$ $4p^{4}D^{\circ}$ — $5s^{4}P$	$\frac{5}{2} - \frac{5}{2}, \frac{7}{2}$
15615,16 15608,08 15580,66 15520,29 15477,78	7 18 5 1094 15	10,63 10,63 10,49 10,63	11 ,42 11 ,42 11 ,42 11 ,29 11 ,43	$4p {}^{4}S^{\circ} - 5s {}^{2}P$ $4p {}^{4}S^{\circ} - 3d {}^{4}P$ $4p {}^{2}D^{\circ} - 3d {}^{2}F$ $4p {}^{4}S^{\circ} - 3d {}^{2}P$	$ \begin{array}{c}$
15467,59 15465,07 15435,14 15416,07 15382,31	169 381 27 32 17	10,47 10,59 11,39 10,50 11,43	11,28 11,39 12,20 11,30 12,24	4p 4D°—3d 4F 4p 2P°—3d 2P 3d 2D—(3P ₁) 4f [4]° 4p 4D°—5s 4P 3d 2P—(3P ₀) 4f [3]	$ \begin{array}{c} 3/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 5/_{2} \end{array} $
15373,88 15351,42 15320,46 15309,08 15269,83	23 2 7 28 8	-11,39 10,49 11,30 11,30	12,20 11,30 12,11 12,11	$ \begin{array}{c} - \\ 3d {}^{2}D - ({}^{3}P_{4}) {}^{4}f [3] \\ 4p {}^{2}D {}^{\circ} - 5s {}^{4}P \\ 5s {}^{4}P - ({}^{3}P_{2}) {}^{4}f [2] \\ 5s {}^{4}P - ({}^{3}P_{2}) {}^{4}f [3] \end{array} $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
15262,98 15225,72 15203,46 15199,65 15183,97	150 13 15 22 8	10,54 11,30 — 11,29	11,35 12,12 — 12,11 —	$ \begin{array}{c} 4p {}^{2}D^{\circ} - 3d {}^{2}D \\ 5s {}^{4}P - ({}^{3}P_{2}) 4f [1] \\ - \\ 3d {}^{2}F - ({}^{3}P_{2}) 4f [4] \end{array} $	7/2—9/2 —
15181,94 15161,15 15108,04 15094,12 15051,60	5 145 269 48 4	11,29 10,40 10,43 11,29 10,47	12,11 11,22 11,25 12,11 11,30	$3d^{2}F$ — $(^{3}P_{2})$ $4f$ [3] $4p^{4}D^{\circ}$ — $3d^{4}F$ $4p^{4}D^{\circ}$ — $3d^{4}F$ $3d^{2}F$ — $(^{3}P_{2})$ $4f$ [5] $4p^{4}D^{\circ}$ — $5s^{4}P$	$\frac{7}{2}$ $-\frac{7}{2}$ $\frac{5}{2}$ $-\frac{5}{2}$
14987,69 14983,51 14955,33 14947,73	29 95 78 43 108	11,29 10,54 10,65 10,47 { 10,54 11,37	12,12 11,36 11,48 11,30 11,37	$5s \stackrel{4}{P} - (^{3}P_{2}) \stackrel{4}{4}f \stackrel{[1]}{\circ}$ $4p \stackrel{2}{P} \stackrel{\circ}{\circ} - 3a \stackrel{4}{4}P$ $4p \stackrel{2}{P} \stackrel{\circ}{\circ} - 5s \stackrel{2}{4}P$ $4p \stackrel{4}{P} \stackrel{\circ}{\circ} - 5s \stackrel{4}{4}P$ $4p \stackrel{2}{P} \stackrel{\circ}{\circ} - 3d \stackrel{4}{4}P$ $3d \stackrel{4}{4}P - (^{3}P_{1}) \stackrel{4}{4}f \stackrel{[2]}{\circ}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $
14931 ,70 14924 ,95 14918 ,68	294 7 6	10,49 — — — (10,59	11,32 — — 11,42	$4p\ ^2D^{\circ} - 3d\ ^2D$	5/2—5/2 ————————————————————————————————
14901 ,33 14892 ,33	10 3	10,49	11,32 12,20	$4p^{2}D^{\circ}-3d^{2}F$ $3d^{4}P-(^{3}P_{1}) 4f$ [2]	5/2—5/2 5/2—3/2, 5/2
14863,53 14806,75 14798,50 14792,29 14731,37	5 82 5 50 45	11,28 10,59 11,28 11,36 11,39	12,11 11,43 12,11 12,20 12,23	$3d {}^{4}F$ —(${}^{3}P_{2}$) $4f [3]$ $4p {}^{2}P^{\circ}$ — $3d {}^{2}P$ $3d {}^{4}F$ —(${}^{3}P_{2}$) $4f [2]$ $3d {}^{4}P$ —(${}^{3}P_{1}$) $4f [3]$ $3d {}^{2}D$ —(${}^{3}P_{0}$) $4f [3]$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
14682 ,82 14576 ,78 14626 ,35	\$ 6 3 9	11,35 10,47 11,35	12,20 11,32 12,20	$3d^{2}P$ —($^{3}P_{1}$) 4f [2] 4p $^{4}D^{\circ}$ —3d ^{2}D 3d ^{2}D —($^{3}P_{1}$) 4f [2]	$^{3}/_{2}$ — $^{5}/_{2}$

		1	<u> </u>		
λ, Λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
14556,68 14529,13	$\begin{array}{c} 25 \\ 4 \end{array}$	10,63 11,35	11,48 12,20	4p 4S°—5s 2P 3d 2D—(3P ₁) 4f [3]°	$^{3/2}_{5/2}$ $^{-1/2}_{5/2}$
14508,63 14497,41 14450,44 14436,26 14384,93	16 60 95 13 4	10,49 10,57 11,25 11,25 10,57	11,35 11,42 12,11 12,11 11,43	4p 2D°-3d 2D 4p 2S°-5s 2P 3d 4F-(3P ₂) 4f [4]° 3d 4F-(3P ₂) 4f [3]° 4p 2S°-3d 2P	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
14369,71 14297,53 14292,07 14255,80 14221,48	$ \begin{array}{r} 148 \\ 2 \\ 73 \\ 3 \\ 2 \end{array} $	10,13 10,50 10,43 10,49 11,32	11,29 11,37 11,30 11,36 12,20	$4p ^4D^{\circ} - 3d ^2F$ $4p ^4D^{\circ} - 3d ^4P$ $4p ^4D^{\circ} - 5s ^4P$ $4p ^2D^{\circ} - 3d ^4P$ $3d ^2F - (^3P_1) 4f [2]^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2, 5/2 \end{array} $
14214 ,95 14198 ,27 14173 ,84 14129 ,80 14122 ,44	5 48 11 14 4	11,36 10,43 10,47 11,32	12,23 11,30 11,35 12,20	$3d^{4}P$ — $(^{3}P_{0})$ $4f$ $[3]^{\circ}$ $4p^{4}D^{\circ}$ — $5s^{4}P$ $4p^{4}D^{\circ}$ — $3d^{2}D$ $3d^{2}F$ — $(^{3}P_{1})$ $4f$ $[3]^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ - \end{array}$
13983,32 13978,14 13961,45 13956,82 13932,97	$egin{array}{c} 4 \\ 120 \\ 19 \\ 2 \\ 15 \end{array}$	 10,54 10,59 10,54 10,47	 11,42 11,48 11,42 11,36	$\begin{array}{c} - \\ 4p \ ^2D° - 5s \ ^2P \\ 4p \ ^2P° - 5s \ ^2P \\ 4p \ ^2D° - 3d \ ^4P \\ 4p \ ^4D° - 3d \ ^4P \end{array}$	$ \begin{array}{c} - \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
13923,92 13911,08 13893,10 13885,14 13853,31	$20 \\ 2 \\ 110 \\ 7 \\ 13$	11,22 11,22 10,47 11,30 10,43	12,11 12,11 11,37 12,20 11,32	$3d {}^{4}F$ — $({}^{3}P_{2}) 4f [4]^{\circ}$ $3d {}^{4}F$ — $({}^{3}P_{2}) 4f [3]^{\circ}$ $4p {}^{4}D^{\circ}$ — $3d {}^{4}P$ $5s {}^{4}P$ — $({}^{3}P_{1}) 4f [2]^{\circ}$ $4p {}^{4}D^{\circ}$ — $3d {}^{2}D$	7/2 - 7/2 $7/2 - 5/2$ $3/2 - 3/2$ $5/2 - 3/2$, $5/2$ $5/2 - 5/2$
13837,58 13827,67 13821,72 13802,82 13772,48	125 9 525 11 50	11,22 10,40 10,49	12,11 11,30 11,39	$3d {}^{4}F$ — $({}^{3}P_{2}) 4f [5]^{\circ}$ — $4p {}^{4}D^{\circ}$ — $5s {}^{4}P$ — $4p {}^{2}D^{\circ}$ — $3d {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
13710,06 13706,12 13602,16 13586,00 13578,45	$\begin{array}{c} 2 \\ 5 \\ 11 \\ 6 \\ 28 \end{array}$	11,30 11,29 11,32 10,57	12,20 12,20 12,23 11,48	5s ⁴ P — (³ P ₄) 4f [3]° 3d ² F — (³ P ₄) 4f [4]° 3d ² F — (³ P ₀) 4f [3]° 4p ² S°—5s ² P	$\begin{array}{c} 5/2 - 5/2 , 7/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 , 7/2 \\ 1/2 - 1/2 \\ - \end{array}$
13498,30 13469,98 13465,13 13419,89 13396,04	160 9 2 90 95	10,43 10,47 11,28 10,40 10,50	11,35 11,39 12,20 11,32 11,42	$4p ^4D^{\circ} - 3d ^2D$ $4p ^4D^{\circ} - 3d ^2P$ $3d ^4F - (^3P_1) 4f [2]^{\circ}$ $4p ^4D^{\circ} - 3d ^2D$ $4p ^4D^{\circ} - 3d ^4P$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 1/2 \end{array}$
13382,46 13378,04 13346,76 13296,01 13243,83	30 33 550 310 350	11,28 11,18 10,49 11,18 10,43	12,20 12,11 14,42 42,41 11,37	$3d {}^{4}F$ — $(^{3}P_{4}) 4f [3]^{\circ}$ $3d {}^{4}F$ — $(^{3}P_{2}) 4f [4]^{\circ}$ $^{4}p {}^{2}D^{\circ}$ — $5s {}^{2}P$ $^{3}d {}^{4}F$ — $(^{3}P_{2}) 4f [5]^{\circ}$ $^{4}p {}^{4}D^{\circ}$ — $3d {}^{4}P$	3/2 - 5/2 $9/2 - 9/2$ $5/2 - 3/2$ $9/2 - 11/2$ $5/2 - 3/2$
13213,42 13208,29 13182,58 13168,90 13129,66	7 20 8 13 100	11,30 10,28 10,33 — 10,54	12,23 11,22 11,28 — 11,48	$5s ^4P - (^3P_0) ^4f [3]^\circ$ $4p ^4P^\circ - 3d ^4F$ $4p ^4P^\circ - 3d ^4F$ $ 4p ^2D^\circ - 5s ^2P$	$\begin{array}{c} {}^{5/2}_{2} - {}^{5/2}_{2} , \ {}^{7/2}_{2} \\ {}^{5/2}_{2} - {}^{7/2}_{2} \\ {}^{1/2}_{2} - {}^{3/2}_{2} \\ - \\ {}^{3/2}_{2} - {}^{1/2}_{2} \end{array}$
13122,59 13107,98 13095,13 13062,73 13059,70	16 4 49 5 4	10,31 11,25 10,47	11,25 	$^{4}P^{4}P^{\circ}-3d^{4}F$ $^{-}3d^{4}F-(^{3}P_{1})^{4}f^{4}[^{4}]^{\circ}$ $^{-}4p^{4}D^{\circ}-5s^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	$E_{\mathbf{B}},\;\mathbf{eV}$	Transition	J
13040,99	125	10,47	11,42	$4p ^4D^{\circ}$ $-3d ^4P$	3/2-1/2
13034,59	9	11,25	12,20	$3d ^4F$ —(3P_4) 4f [3]°	$\frac{5}{2}$ $\frac{5}{2}$, $\frac{7}{2}$
12976,77	20	10,33	11,29	$4p ^4P^{\circ}$ — $5s ^4P$	$\frac{1}{2}$
12908,57	24	11,28	12,23	$3d_{4}F - (^{3}P_{0}) 4f [3]^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
12872,10	39	10,40	11,36	$4p ^4D^{\circ} - \dot{3}d ^4P$	1/2-0/2
12869,80	4				5/ 3/
12859 ,16 12803 ,05	13 37	10,43	11,39	4p ⁴ D°—3d ² P 4p ⁴ P°—5s ⁴ P	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
12795,00	12	10,33	11,30	4p -P = 3s -P	- /2 - /2 -
12661,75	47	11,22	12,20	$3d ^4F - (^3P_4) 4f [4]^\circ$	⁷ / ₂ — ⁹ / ₂
12621,35	47	-	_		_
12594,15	$1\overline{42}$	40,31	11,29	$4p^{-4}P^{\circ}$ —5 $s^{-4}P$	$^{3}/_{2}$ — $^{1}/_{2}$
12585,09	10	11,25	12.24	$3d^{4}F$ — $(^{3}P_{0})$ 4f [3]°	$\frac{5}{2}$ $\frac{5}{2}$, $\frac{7}{2}$
12563 ,58 12502 ,69	38		11.20	/4D2 5.4D	
	63	10,31	11,30	$4p ^4P^{\circ} - 5s ^4P$	
12430 ,13 12389 ,03	$\begin{array}{c} 12 \\ 4 \end{array}$	10,31	11,30	$4p\ ^4P^{\circ}-5s\ ^4P$	$^{3}/_{2}$ 3 $/_{2}$
12389,03	16	_	-		_
12236,26	$\overset{1}{5}$	_	_		_
12231,13	16	10,33	11,35	$4p$ 4P $^\circ$ $-3d$ 2D	$^{1}/_{2}$ — $^{3}/_{2}$
12229,52	4	_	_	-	
12179,72	7 7	10,28	11,30	$4p ^4P^{\circ} - 5s ^4P$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
12172,95 12110,96	60 60	10,31 $10,28$	11,32 11,30	$\frac{4p}{4p} ^4P^{\circ} - 3d ^2D$ $4p ^4P^{\circ} - 5s ^4P$	$\frac{3}{2}$
12021,67	172	10,28 $10,33$	11,30	4p P - 3s P $4p 4P^{\circ} - 3d 4P$	$\frac{1}{2}$ _3/2
11866,50	195	10,28	11,32	$4p ^4P^{\circ} - 3d ^2D$	$\frac{5}{2}$ $\frac{5}{2}$
11720,50	180	10,28 $10,31$	$\frac{11,32}{11,36}$	4p P -3d D $4p 4P \sim -3d 4P$	$3/2^{2}_{2}$ $-5/2$
11692,73	85	10,31	11,37	4p $4P$ °— $3d$ $4P$	3/2 - 3/2
11636,22	4	_	_		
11598,74	5	10,28	11,35	4p 4P°—3d 2D	$^{5}/_{2}$ — $^{3}/_{2}$
11579,91	9	_	-	-	_
11577,24 11573,48	$\frac{11}{2}$	11,35	$\frac{-}{12,42}$	$3d^{2}P - (^{3}P_{2}) 5f [1]^{6}$	${3}/_{2}$ ${-1}/_{2}$, $\frac{3}{2}$
11436,34	1000	10,28	11,36	$4p^{4}P^{\circ} - 3d^{4}P$	$\frac{5}{2}$ $\frac{5}{2}$
11409,68	269	10,28	11,37	$4p ^4P^{\circ} - 3d ^4P$	$^{5}/_{2}$ — $^{3}/_{2}$
11392,66	231	10,33	11,42	$4p ^4P^{\circ}$ — $5s ^2P$	$^{1}/_{2}$ — $^{1}/_{2}$
11378,01	45	10,33	11,42	$4p ^4P^{\circ}$ — $3d ^4P$	$^{1}/_{2}$ — $^{1}/_{2}$
11373,93	5	— 44. 39	49 49	$3d^{2}F$ — $(^{3}P_{2})$ 5f [4]	5/ ₂ — ⁷ / ₂
11331,08 11326,53	5 6	11,32 11,32	$\substack{12,42\\12,42}$	$3d ^{2}D - 100166^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
	3		12,42	3d ² D-100184°	⁵ / ₂ — ⁷ / ₂
11306,70 11302,26	4	11 <u>,</u> 32 —	12,42 —		- '2
11286,39	$\dot{9}$		_	_	_
11151,25	6			4p 4P°—3d 2P	
11122,97	300	10,28	11,39	-	
11096,70	56	10,31	11,42	$4p\ ^4P^{\circ}-5s\ ^2P \ 5s\ ^4P-100181^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
11093,76 11093,04	$\frac{6}{6}$	11,30 —	12 ,42 —	_	- 12
11033,04 1 1 082,93	206	10,31	11,42	$4p ^4P^{\circ} - 3d ^4P$	$\frac{3}{2} - \frac{3}{2} \frac{1}{2}$
11072,10	3	11,30	12,42	$5s ^4P - (^3P_2) 5f [1]$	3/2 - 3/2, 1/2
11063,58	2	11,42	12,54	5s ² P-101172°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
11055,22	2	11,30	12,42	$5s ^4P - (^3P_2) 5f [3]$	$\frac{5}{2}$ $\frac{7}{2}$, $\frac{5}{2}$
11014,52	3	11,29	12,42	$3d^{2}F$ — $(^{3}P_{2})^{2}5f$ [4]	$^{\circ}$ $^{7/2-9/2}$, $^{7/2}$ $^{7/2-7/2}$
10986,71	13	11,29	$12,42 \\ 12,42$	$3d \ ^2F$ — 100184° $5s \ ^4P$ — $(^3P_2) \ 5f \ [1]'$	
10945,43	5	11,29			
10841,55	100	{ 10,28 11,28	11,42	$^{4p}_{4P}^{4P}^{6}-5s~^{2}P_{3d~^{4}F}-100166^{\circ}$	$\frac{5}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{5}{2}$
10831,68	9	11,28 11,36	42,42 12,51	$3d^{4}P - (^{3}P_{1}) 5f [3]^{\circ}$	
10001,00	J	11,00	12,01	(- 1/ -/ 10 /	301
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λ, Å	I	$E_{ m H}^{}$, eV	E_{B} , eV	Transition	J
10822,20 10785,12 10717,84	3 7 2	33, 33 11, 39 11, 35	11,48 12,54 12,50	4p 4P°—5s 2P 3d 2P—101172° 3d 2D—(3P ₁) 5f [2]°	$^{1/_{2}-^{1/_{2}}}_{^{3/_{2}-^{3/_{2}}},}$ $^{5/_{2}}_{^{2}}$
10690,94 10681,99 10620,37 10600,53	14 7 7 18	_ _ 10,94		 3d ⁴ D-(³ P ₂) 4f [2]°	
10560,89	4	10,94	12,12	$3d ^4D - (^3P_2) 4f [1]^\circ$	$^{1}/_{2}$ — $^{1}/_{2}$
10554,96 10539,18 10506,72 10472,38 10467,86	8 44 33 3 7	10,31 10,93 10,93 11,32 10,93	11,48 12,11 12,11 12,51 12,12	$4p ^4P^{\circ} - 5s ^2P$ $3d ^4D - (^3P_2) 4f [3]^{\circ}$ $3d ^4D - (^3P_2) 4f [2]^{\circ}$ $3d ^2F - (^3P_1) 5f [3]^{\circ}$ $3d ^4D - (^3P_2) 4f [1]^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
10427,54 10420,26 10420,05 10392,51 10387,97	44 105 105 331 34	10,92 10,92 10,92 9,28 10,92	12,11 12,11 12,11 10,47 12,11	$\begin{array}{c} 3d \ ^4D - (^3P_2) \ 4f \ [4]^{\circ} \\ 3d \ ^4D - (^3P_2) \ 4f \ [3]^{\circ} \\ 3d \ ^4D - (^3P_2) \ 4f \ [3]^{\circ} \\ 4s \ ^2P - 4p \ ^4D^{\circ} \\ 3d \ ^4D - (^3P_2) \ 4f \ [2]^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
10350,02 10329,77 10320,08 10312,16 10305,50	$\begin{array}{c} 2 \\ 5 \\ 205 \\ 44 \\ 22 \end{array}$	10,92 11,22 10,91 10,91	12,12 12,42 12,11 12,11	3d ⁴ D—(³ P ₂) 4f [1]° 3d ⁴ F—(³ P ₂) 5f [4]° 3d ⁴ D—(³ P ₂) 4f [4]° 3d ⁴ D—(³ P ₂) 4f [3]° —	$\begin{array}{c} {}^{5/2}_{2} - {}^{3/2}_{2} \\ {}^{7/2}_{2} - {}^{7/2}_{2}, \ {}^{9/2}_{2} \\ {}^{7/2}_{2} - {}^{9/2}_{2}, \ {}^{5/2}_{2} \\ - \end{array}$
10280,07 10221,12	4 10	10,91 —	12,11 —	3d 4D—(3P ₂) 4f [2]°	⁷ / ₂ — ⁵ / ₂
10091,64 10002,25 9875,95	40 4 50	9,20 11,18 9,28	10,43 12,42 10,54	4s ² P—4p ⁴ D° 3d ⁴ F—100184° 4s ² P—4p ² D°	$\frac{3}{2} - \frac{5}{2}$ $\frac{9}{2} - \frac{7}{2}$ $\frac{1}{2} - \frac{3}{2}$
9815,74 9808,46 9806,90 9744,33 9702,35	3 5 25 30 40	10,93 10,43 10,43 9,20 9,03	12,20 11,69 11,69 10,47 10,31	3d ⁴ D—(³ P ₄) ⁴ f [2] ^c 4s' ² D—4p' ² P° 4s' ² D—4p' ² P° 4s ² P—4p ⁴ D° 4s ⁴ P—4p ⁴ P°	3/2 - 5/2 $3/2 - 3/2$ $5/2 - 3/2$ $3/2 - 3/2$ $1/2 - 3/2$
9669,54 9661,90 9632,37 9609,06 9592,20	5 20 20 35 75	10,92 10,43 9,28 10,91 9,20	12,20 11,71 10,57 12,20 10,49	$\begin{array}{c} 3d\ ^4D - (^3P_1)\ ^4f\ [3]^\circ \\ 4s'\ ^2D - 4p'\ ^2P^\circ \\ 4s\ ^2P - 4p\ ^2S^\circ \\ 3d\ ^4D - (^3P_1)\ ^4f\ [4]^\circ \\ 4s\ ^2P - 4p\ ^2D^\circ \end{array}$	$\begin{array}{c} 5/_2 - 5/_2, & 7/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 7/_2 - 9/_2 \\ 3/_2 - 5/_2 \end{array}$
9588,01 9584,77 9576,43 9571,30 9554,96	5 50 8 5 4	11,25 8,98 10,91 11,29 9,20	12,54 10,28 12,20 12,59 10,50	3d ⁴ F-101172° 4s ⁴ P-4p ⁴ P° 3d ⁴ D-(³ P ₁) 4f [3]° 3d ² F-101530° 4s ² P-4p ⁴ D°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9516,94 9486,89 9481,93 9452,06 9419,82	15 25 3 75 40	10,93 9,03 10,43 9,28 10,92	12,23 10,33 11,74 10,59 12,23	3d ⁴ D-(³ P ₀) 4f [3]° 4s ⁴ P-4p ⁴ P° 4s' ² D-5p ⁴ P° 4s ² P-4p ² P° 3d ⁴ D-(³ P ₀) 4f [3]°	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2, & 7/2 \end{array} $
9414,07 9393,81 9288,82 9212,39 9197,49	2 50 60 3 25	11,39 8,98 9,20 10,43 9,28	12,71 10,31 10,54 11,77 10,63	$3d\ ^{2}P-102522^{\circ}\ ^{4}s\ ^{4}P-4p\ ^{4}P^{\circ}\ ^{4}s\ ^{2}P-4p\ ^{2}D^{\circ}\ ^{4}s'\ ^{2}D-5p\ ^{4}P^{\circ}\ ^{4}s\ ^{2}P-4p\ ^{4}S^{\circ}$	$ \frac{3}{2} - \frac{3}{2}, \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{3}{2} $
9191,67 9121,10 9073,15 9069,66 9068,39	60 75 50 25 3	8,98 8,92 9,20 10,43 10,43	10,33 10,28 10,57 11,79 11,79	$4s ^4P - 4p ^4P^{\circ}$ $4s ^4P - 4p ^4P^{\circ}$ $4s ^2P - 4p ^2S^{\circ}$ $4s' ^2D - 4p' ^2F^{\circ}$ $4s' ^2D - 4p' ^2F^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
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λ, Å	I	$E_{_{ m H}}$, eV	E _B , eV	Transition	J
9050 ,10 9045 ,40 9038 ,96 8980 ,10 8948 ,01	$\begin{array}{c} 4 \\ 40 \\ 30 \\ 2 \\ 50 \end{array}$	11,22 9,28 10,43 11,29 8,92	12,59 10,65 11,80 12,67 10,31	3d ⁴ F—101530° 4s ² P—4p ² P° 4s' ² D—4p' ² F° 3d ² F—102218° 4s ⁴ P—4p ⁴ P°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8931,20 8912,88 8841,70 8815,28 8713,69	$\begin{array}{c} 2\\ 40\\ 15\\ 30\\ 3\end{array}$	10,43 9,20 11,48 11,18 11,25	11,82 10,59 12,88 12,59 12,67	$4s' ^{2}D - 5p ^{4}D^{\circ}$ $4s ^{2}P - 4p ^{2}P^{\circ}$ $5s ^{2}P - 103905^{\circ}$ $3d ^{4}F - 101530^{\circ}$ $3d ^{4}F - 102218^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
8711,58 8700,44 8686,28 8641,75 8634,84	1 5 30 3 2	10,43 11,42 9,20 10,43 11,28	11,85 12,85 10,63 11,86 12,71	4s' ² D—5p ² S° 3d ⁴ P—103638° 4s ² P—4p ⁴ S° 4p ⁴ D°—4d ⁴ D 3d ⁴ F—102522°	3/2 - 1/2 $1/2 - 3/2$ $3/2 - 3/2$ $5/2 - 7/2$ $3/2 - 3/2$, $5/2$
8628,61 8585,96 8577,98 8575,25 8550,46	4 100 7 75 20	10,43 8,98 10,43 9,03 9,20	11,86 10,43 11,87 10,47 10,65	$4s' ^2D - 5p ^2D^{\circ} \ 4s ^4P - 4p ^4D^{\circ} \ 4p ^4D^{\circ} - 4c' ^4D \ 4s ^4P - 4p ^4D^{\circ} \ 4s ^2P - 4p ^2P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
8519,72 8497,32 8488,85 8472,96 8467,32	8 5 2 3 25	11,22 10,43 11,25 10,63 10,40	12,67 11,88 12,71 12,09 11,86	$3d\ ^4F-102218^{\circ}\ ^4p\ ^4D^{\circ}-4d\ ^4D\ ^3d\ ^4F-102522^{\circ}\ ^4p\ ^4S^{\circ}-4d\ ^2D\ ^4p\ ^4D^{\circ}-4d\ ^4D$	7/2 - 7/2 $5/2 - 3/2$ $5/2 - 3/2$, $5/2$ $3/2 - 5/2$ $7/2 - 7/2$
8428,25 8406,20 8403,70 8397,61 8392,20	100 10 1 3 15	9,03 10,40 10,59 — 10,94	10,50 11,87 12,07 — 12,42	$\begin{array}{c} 4s ^{4}P - 4p ^{4}D^{\circ} \\ 4p ^{4}D^{\circ} - 4d ^{4}D \\ 4p ^{2}P^{\circ} - 4d ^{4}P \\ - \\ 3d ^{4}D - 100181^{\circ} \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ - \\ 1/2 - 3/2 \end{array} $
8383,58 8375,95 8358,28 8343,90	$ \begin{array}{r} 4 \\ 450 \\ 6 \\ 50 \end{array} $	8,92 11,37 { 10,93 11,36	10,40 12,85 12,42 12,85		$ \begin{array}{c} - \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
8333 ,27	5000	$\left\{\begin{array}{c} 10,93 \\ 8,98 \end{array}\right.$	$12,42 \\ 10,47$	3d ⁴ D - 100181° 4s ⁴ P - 4p ⁴ D°	$\frac{3}{2} = \frac{3}{2}$ $\frac{3}{2} = \frac{3}{2}$
8304,69 8286,67 8280,95 8273,79 8271,70	5 7 7 7	10,59 10,63 10,49	12,08 — 12,13 11,99 —	4p ² P°—6s ⁴ P — 4p ⁴ S°—4d ² D 4p ² D°—4d ⁴ F —	3/2 - 3/2 $-3/2$ $3/2 - 3/2$ $5/2 - 7/2$ $-$
8269,15 8267,97 8258,64 8221,73 8220,40	60 3 4 75 60	10,92 10,59 10,92 8,98 9,03	12,42 12,09 12,42 10,49 10,54	$3d^{4}D$ — 100166° $4p^{2}P^{\circ}$ — $4d^{2}D$ $3d^{4}D$ — 100181° $4s^{4}P$ — $4p^{2}D^{\circ}$ $4s^{4}P$ — $4p^{2}D^{\circ}$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
8212,00 8206,40 8203,76 8200,95 8200,20	100 2 12 25 35	8,92 10,65 10,49 10,90 10,43	10,43 12,16 12,00 12,42 11,94	$4s^{4}P - 4p^{4}D^{\circ}$ $4p^{2}P^{\circ} - 6s^{4}P$ $4p^{2}D^{\circ} - 4d^{2}F$ $3d^{4}D - 100166^{\circ}$ $4s'^{2}D - 5p^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
8199,02 8194,35 8170,09 8161,52 8129,55 8121,40	35 50 10 12 2	10,43 8,98 10,57 11,36 10,49 10,63	11,94 10,50 12,08 12,88 12,02 12,15	$4s' {}^{2}D - 5p {}^{2}P^{\circ}$ $4s {}^{4}P - 4p {}^{4}D^{\circ}$ $4p {}^{2}S^{\circ} - 6s {}^{4}P$ $3d {}^{4}P - 103905^{\circ}$ $4p {}^{2}D^{\circ} - 4d {}^{4}F$ $4p {}^{4}S^{\circ} - 4d {}^{4}P$	$\begin{array}{c} 5/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 3/_2 \end{array}$
8117,75	4			· —	

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λ, Å	I	$E_{ m H}^{},~{ m eV}$	$E_{_{ m B}},~{ m eV}$	Transition	J
8094,76 8087,69 8086,67	12 20 75	10,54 10,43 10,43	12,07 11,96 11,96	4p ² D°-4d ⁴ P 4s' ² D-4p' ² D° 4s' ² D-4p' ² D°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
8085,54 8084,48 8051,08 8023,30 8015,57	60 35 20 18 45	10,43 10,43 9,03 10,47 10,43	11,96 11,96 10,57 12,02 11,97	$4s' \ ^2D - 4p' \ ^2D^{\circ}$ $4s' \ ^2D - 4p' \ ^2D^{\circ}$ $4s \ ^4P - 4p \ ^2S^{\circ}$ $4p \ ^4D^{\circ} - 4d \ ^4F$ $4s' \ ^2D - 5p \ ^2P^{\circ}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{1}{2} $
7997,80 7985,80 7980,58 7976,95 7974,72	50 4 15 25 20	8,98 8,92 10,33 10,49	10,54 	$4s ^4P - 4p ^2D^{\circ}$ $ 4s ^4P - 4p ^4D^{\circ}$ $4p ^4P^{\circ} - 4d ^4D$ $4p ^2D^{\circ} - 4d ^2F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
7968,66 7952,49 7940,65 7938,90 7933,85	3 15 2 8 50	10,54 10,50 10,49	12,09 12,06 12,05	$4p ^2D^{\circ} - 4d ^2D$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^2D^{\circ} - 6s ^4P$ $ 4p ^4D^{\circ} - 4d ^4F$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ - \end{array} $
7924,62 7915,09 7899,28 7898,10 7893,33	100 25 45 5	10,40 9,03 10,33 10,31 10,59	11,96 10,59 11,90 11,87 12,16	$4p \ 4D \ -4d \ P$ $4s \ ^4P - 4p \ ^2P^\circ$ $4p \ ^4P^\circ - 4d \ ^4D$ $4p \ ^4P^\circ - 4d \ ^4D$ $4p \ ^2P^\circ - 6s \ ^4P$ $-$	7/2 - 9/2 $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$ $3/2 - 1/2$ $-$
7886,00 7878,22 7872,50 7870,68 7839,42	6 75 1 1 8	8,92 10,47 10,43 10,47	10,49 12,05 12,00 12,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} - & - \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
7837,40 7830,76 7825,80 7821,35 7815,34	6 30 3 45 1	8,98 10,31 10,47 10,28 10,50	10,57 11,88 12,06 11,86 12,08	$4s ^4P - 4p ^2S^{\circ}$ $4p ^4P^{\circ} - 4d ^4D$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^4P^{\circ} - 4d ^4D$ $4p ^4D^{\circ} - 6s ^4P$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 3/2$ $5/2 - 7/2$ $1/2 - 3/2$
7810,06 7802,27 7798,59 7790,56 7787,75	3 6 5 5 4	10,57 10,43 10,54 10,49 10,40	12,15 12,02 12,13 12,08 11,99	$4p^{2}S^{\circ}-4d^{4}P$ $4p^{4}D^{\circ}-4d^{4}F$ $4p^{2}D^{\circ}-4d^{2}D$ $4p^{2}D^{\circ}-6s^{4}P$ $4p^{4}D^{\circ}-4d^{4}F$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \end{array} $
7777,82 7771,10 7769,18 7754,78 7744,94	10 12 30 6 125	10,47 10,31 10,28 — 9,03	12,07 11,90 11.87 — 10,63	$4p ^4D^{\circ} - 4d ^4P$ $4p ^4P^{\circ} - 4d ^4D$ $4p ^4P^{\circ} - 4d ^4D$ $ 4s ^4P - 4p ^4S^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ - \\ 1/2 - 3/2 \end{array} $
7717,57 7702,89 7697,40 7692,97 7672,44	100 10 8 7 25	8,98 10,28 10,93 10,47 8,92	10,59 11,88 12,54 12,08 10,54	$4s ^4P - 4p ^2P^{\circ}$ $4p ^4P^{\circ} - 4d ^4D$ $3d ^4D - 101172^{\circ}$ $4p ^4D^{\circ} - 6s ^4P$ $4s ^4P - 4p ^2D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
7659,50 7656,86 7633,72 7628,35 7561,19	5 6 20 1 4	{ 10,43 10,40 10,54 10,92 10,43	12,05 12,02 12,15 12,54 12,05	$4p ^4D^{\circ} - 4d ^2F$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^2D^{\circ} - 4d ^4P$ $3d ^4D - 101172^{\circ}$ $4p ^4D^{\circ} - 6s ^4P$	$\begin{array}{c} 5/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2, 5/2 \\ 5/2 - 5/2 \end{array}$
7547,06 7496,56 7492,12 7489,46 7462,40	100 1 100 8 8	8,98 10,93 10,40 10,43 10,49	10,63 12,59 12,05 12,08 12,15	$\begin{array}{c} - \\ 4s ^4P - 4p ^4S^{\circ} \\ 3d ^4D - 101520^{\circ} \\ 4p ^4D^{\circ} - 6s ^4P \\ 4p ^4D^{\circ} - 6s ^4P \\ 4p ^2D^{\circ} - 4d ^4P \end{array}$	$ \begin{array}{c}$
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λ, Α	I	$E_{ m H}^{},{ m eV}$	E _B , eV	Transition	J
7459 ,42 7454 ,08 7444 ,32 7436 ,13 7435 ,71	3 2 3 10 7	10,43 10,50 8,98 10,92 10,40	12,09 12,16 10,65 12,59 12,07	$4p \ ^4D^{\circ}-4d \ ^2D$ $4p \ ^4D^{\circ}-6s \ ^4P$ $4s \ ^4P-4p \ ^2P^{\circ}$ $3d \ ^4D-101520^{\circ}$ $4p \ ^4D^{\circ}-4d \ ^4P$	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \end{array}$
7414,10 7382,47 7380,92 7372,65 7342,74	90 3 4 1 3	8,92 10,90 10,47 10,47	10,59 	$4s ^4P - 4p ^2P$ $ 3d ^4D - 101520^{\circ}$ $4p ^4D^{\circ} - 4d ^4P$ $4p ^4D^{\circ} - 6s ^4P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
7342,00 7329,33 7256,63 7252,48 7244,76	1 3 125 3 3	10,65 10,40 8,92 — 10,63	12,34 12,09 10,63 — 12,34	$4p^{2}P^{\circ}-4d^{2}P$ $4p^{4}D^{\circ}-4d^{2}D$ $4s^{4}P-4p^{4}S^{\circ}$ $ 4p^{4}S^{\circ}-4d^{2}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ - \\ 3/2 - 3/2 \end{array} $
7194 ,94 7185 ,68 7146 ,38	5 2 5	10,33 10,43	12,06 12,15 —	4p 4P°—4d 4F 4p 4D°—4d 4P —	$^{1/2}_{/2}$ $^{-3/2}_{/2}$ $^{5/2}_{/2}$ $^{-3/2}_{/2}$
7127 ,35 7094 ,20 7086 ,80 7082 ,35	3 8 25 3	10,28 10,59 10,31 10,33	12,02 12,34 12,05 12,08	$4p ^4P^{\circ}$ — $4d ^4F$ $4p ^2P^{\circ}$ — $4d ^2P$ $4p ^4P^{\circ}$ — $6s ^4P$ $4p ^4P^{\circ}$ — $6s ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
7075,64 7060,18 7058,25	3 2 1	10,31 10,47 10,57	12,06 12,23 12,32	4p 4P°—4d 4F 4p 4D°—4d 4P 4p 2S°—5d 4D	$\frac{3}{2} \frac{-3}{2}$ $\frac{3}{2} \frac{-1}{2}$ $\frac{1}{2} \frac{-1}{2}$
7036,30 7019,30 7011,24 7008,00	5 4 3 10	10,31 10,90 — 10,28 10,59	12,07 12,67 — 12,05 12,36	$4p^{4}P^{\circ}-4d^{4}P \ 3d^{4}D-102218^{\circ} \ - \ 4p^{4}P^{\circ}-4d^{2}F \ 4p^{2}P^{\circ}-4d^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 7/2 \\ - \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
7006,30 6995,88 6981,85 6979,60 6977,00 6966,80	4 12 25 3 5 8	10,57 10,28 10,59 — 10,31	12,34 12,05 12,37 - 12,08	$4p^{2}S^{\circ}-4d^{2}P$ $4p^{4}P^{\circ}-6s^{4}P$ $4p^{2}P^{\circ}-5d^{4}F$ $-4p^{4}P^{\circ}-6s^{4}P$	$ \begin{array}{c} 1/2 & 3/2 \\ 1/2 & 3/2 \\ 5/2 & 5/2 \\ 3/2 & 5/2 \\ & & \\ & & \\ 3/2 & 3/2 \end{array} $
6962,50 6932,90 6925,35 6924,40	$\begin{array}{c} 6 \\ 25 \\ 6 \\ 5 \\ 3 \end{array}$	10,28	12,07	$\begin{array}{c} - \\ 4p \ ^4P^{\circ}-4d \ ^4P \\ - \\ - \\ 3d \ ^4D-102522^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6920,31 6910,32 6872,85 6865,36 6854,45 6841,74	3 6 6 8 10 6	10,92 10,57 10,54 10,28 — 10,63	12,71 12,36 12,34 12,08 — 12,44	$4p^{2}S^{\circ}-4d^{2}P$ $4p^{2}D^{\circ}-4d^{2}P$ $4p^{4}P^{\circ}-6s^{4}P$ $-4p^{4}S^{\circ}-5d^{2}D$	$\begin{array}{c} $
6840,23 6837,60 6816,50 6811,50 6810,04	15 5 2 3 15	10,28 10,49 10,50 10,31 10,33	12,09 12,31 12,32 12,13 12,15	$4p ^4P^{\circ} - 4d ^2D$ $4p ^2D^{\circ} - 5d ^4D$ $4p ^4D^{\circ} - 5d ^4D$ $4p ^4P^{\circ} - 4d ^2D$ $4p ^4P^{\circ} - 4d ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
6791,92 6790,20 6784,45 6765,20 6762,30	3 2 1 3 2	10,50 10,54 10,33 10,54 10,47	12,32 12,36 12,16 12,37 12,31	$4p ^4D^{\circ} - 5d ^4D$ $4p ^2D^{\circ} - 4d ^2P$ $4p ^4P^{\circ} - 6s ^4P$ $4p ^2D^{\circ} - 5d ^4F$ $4p ^4D^{\circ} - 5d ^4D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
6757 ,75 6751 ,54 6730 ,24	5 4 5	10,59 10,63	12,43 12,47	4p ² P°—5d ² D 4p ⁴ S°—5d ² F	$\frac{-}{3/2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
6723,40 6714,65	4 4	10,47 10,28	12,32 12,13	4p ⁴ D°—5d ⁴ D 4p ⁴ P°—4d ² D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
6709,90 6703,20 6699,40 6697,45 6678,39	15 6 3 2 10	10,31 10,47 10,57 10,31	12,15 12,32 12,41 12,16		$\begin{array}{c} \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
6643,10 6609,26 6604,57 6600,10 6567,35	1 7 7 3 3	10,47 10,28 10,43 10,59 10,43	12,34 12,15 12,31 12,47 12,32	$4p ^4D^{\circ}$ — $4d ^2P$ $4p ^4P^{\circ}$ — $4d ^4P$ $4p ^4D^{\circ}$ — $5d ^4D$ $4p ^2P^{\circ}$ — $5d ^2F$ $4p ^4D^{\circ}$ — $5d ^4D$	3/2 $3/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
6565,90 6551,28	1 3	10,47	12,36	$4p ^4D^{\circ} - 4d ^2P$	3/ ₂ —1/ ₂
6550,80 6542,40 6536,10	3 8 1	{ 10,54 10,50 10,47 10,59	12,43 12,39 12,37 12,49	$4p ^2D^{\circ} - 5d ^2D$ $4p ^4D^{\circ} - 5d ^4F$ $4p ^4D^{\circ} - 5d ^4F$ $4p ^2P^{\circ} - 5d ^4F$	3/2 - 5/2 $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 1/2$
6531,39 6509,00 6502,21 6490,55 6471,45	20 2 5 1 3	10,40 10,54 10,40 10,43	12,30 12,44 12,31 12,34	$4p ^4D^{\circ} - 5d ^4D$ $4p ^2D^{\circ} - 5d ^2D$ $4p ^4D^{\circ} - 5d ^4D$ $4p ^4D^{\circ} - 4d ^2P$	$^{7/2}$ _{2}_{3/2}_{3/2}_{3/2}_{2}_{7/2}_{5/2}_{5/2}_{3/2}_{3/2}_{-}
6464,60 6457,14 6450,30 6443,76 6434,79	1 1 12 2 15	10,47 10,50 10,49 10,31 10,43	12,39 12,41 12,42 12,23 12,36	$4p ^4D^{\circ} - 5d ^4F$ $4p ^4D^{\circ} - 5d ^4P$ $4p ^2D^{\circ} - 5d ^2F$ $4p ^4P^{\circ} - 4d ^4P$ $4p ^4D^{\circ} - 5d ^4F$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
6425,61	8	 10,54	12,47	4p ² D°-5d ² F	
6408,05 6398,63 6394,75 6376,28	7 20 4 3	10,49 10,40 10,43	12,43 12,34 12,37	$4p \ ^2D^{\circ} - 5d \ ^2D$ $4p \ ^4D^{\circ} - 5d \ ^4F$ $4p \ ^4D^{\circ} - 5d \ ^4F$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6373,37 6367,98 6341,66 6334,96 6326,74	1 3 10 4 3	10,47 10,49 10,47 — 10,57	12,41 12,44 12,43 — 12,53	$4p \ ^4D$.° — $5d \ ^4P$ $4p \ ^2D$ ° — $5d \ ^2D$ $4p \ ^4D$ ° — $5d \ ^2D$ — $4p \ ^2S$ ° — $6d \ ^4D$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ - \\ 1/2 - 3/2 \end{array} $
6321,59 6280,20 6252,26 6242,54 6231,48	6 5 8 4 8	10,43 10,33 10,43 10,33	12,40 12,32 12,42 12,32	$-4p^{4}D^{\circ}-3$ $4p^{4}P^{\circ}-5d^{4}D$ $4p^{4}P^{\circ}-5d^{2}F$ $4p^{4}P^{\circ}-5d^{4}D$	$ \begin{array}{c} - \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
6226,39 6211,55 6194,72 6165,38 6162,05	3 6 15 1 12	10,49 10,40 10,31 10,43 10,31	12,48 12,40 12,31 12,44 12,32	$4p^{2}D^{\circ}$ -5 $d^{2}P$ $4p^{4}D^{\circ}$ -5 $d^{4}P$ $4p^{4}P^{\circ}$ -5 $d^{4}D$ $4p^{4}P^{\circ}$ -5 $d^{2}D$ $4p^{4}P^{\circ}$ -5 $d^{4}D$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
6151,34 6141,79 6140,21 6114,37 6082,53	2 4 25 15 4	10,40 10,31 10,28 10,28 10,28	12,42 12,32 12,30 12,31 12,32	$4p ^4D^{\circ} - 5d ^2F$ $4p ^4P^{\circ} - 5d ^4D$	$ \begin{array}{c} 7/_{2} - 7/_{2} \\ 3/_{2} - 1/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
6019,71 5991,42 5948,40 5934,00	6 4 4 1	10,33 10,33 10,33 10,28	12,39 12,40 12,41 12,37	$4p ^4P^{\circ} - 2$ $4p ^4P^{\circ} - 3$ $4p ^4P^{\circ} - 5d ^4P$ $4p ^4P^{\circ} - 5d ^4F$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \end{array} $

λ, Å	I	$E_{ m H}^{},$ eV	$E_{_{ m B}}$, eV	Transition	J
5930,35	6	{ \begin{pmatrix} 10,43 \\ 10,31 \end{pmatrix}	12,52 12,40	4p 4D°—6d 4D 4p 4P°—5d 4P	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$
5908,22 5866,75 5856,70 5847,68 5846,70	2 4 8 7 8	10,43 10,31 10,28 10,40	12,53 12,41 12,40 12,52	4p ⁴ D°—6d ⁴ D 4p ⁴ P°—5d ⁴ P 4p ⁴ P°—5d ⁴ P 4p ⁴ D°—6d ⁴ D	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ - \end{array} $
5844,15 5839,85 5826,24 5806,76 5802,84	6 4 2 2 5	10,31 10,31 10,40 10,31 10,28	12,42 12,43 12,53 12,44 12,42	$4p ^4P^{\circ} - 5d ^4P$ $4p ^4P^{\circ} - 5d ^2D$ $4p ^4D^{\circ} - 6d ^4D$ $4p ^4D^{\circ} - 5d ^2D$ $4p ^4P^{\circ} - 5d ^2F$	3/2 $3/2$ $3/2$ $5/2$ $7/2$ $5/2$ $7/2$ $5/2$ $3/2$ $3/2$ $5/2$ $7/2$
5799,88 5796,26 5774,72 5772,58 5768,30	12 15 4 5 2			 4p ⁴ P°5d ⁴ P 4p ⁴ P°5d ² D	- $ 5/2-3/2$ $5/2-5/2$
5765,55 5726,16 5686,28 5654,20 5620,72	3 5 1 1	10,33 10,31 10,33 10,33 10,28	12,48 12,47 12,51 12,53 12,48	$4p ^4P^{\circ} - 5d ^2P$ $4p ^4P^{\circ} - 5d ^2F$ $4p ^4P^{\circ} - 6d ^4D$ $4p ^4P^{\circ} - 6d ^4D$ $4p ^4P^{\circ} - 5d ^2P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
5580,45 5578,13 5532,13 5512,95 5493,14	3 3 8 4 3	10,31 10,31 10,28 10,28	12,53 12,53 12,52 12,53	4p 4P°—6d 4D 4p 4P°—6d 4D 4p 4P°—6d 4D 4p 4P°—6d 4D ————————————————————————————————————	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ - \end{array} $
5140,35 5099,80 4976,62 4971,77 4938,59	5 8 10 —	9,28 9,28 9,20 9,28 9,20	11,69 11,71 11,69 11,77 11,71	$4s^{2}P-4p'^{2}P^{\circ}$ $4s^{2}P-4p'^{2}P^{\circ}$ $4s^{2}P-4p'^{2}P^{\circ}$ $4s^{2}P-5p^{4}P^{\circ}$ $4s^{2}P-4p'^{2}P^{\circ}$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \end{array}$
4891,52 4852,70 4818,64 4818,42 4796,76	- 8 2 3 2	9,20 9,20 9,28 9,20 9,28	11 ,74 11 ,76 11 ,85 11 ,77 11 ,86	$4s^{2}P - 5p^{4}P^{\circ}$ $4s^{2}P - 5p^{4}D^{\circ}$ $4s^{2}P - 5p^{4}S^{\circ}$ $4s^{2}P - 5p^{4}P^{\circ}$ $4s^{2}P - 5p^{2}D^{\circ}$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 3/2$
4740,71 4721,24 4691,53 4677,76 4674,40	10 8 12 7 2	9,20 9,20 9,20 9,20 9,20	11,82 11,83 11,84 11,85 11,85	$4s\ ^{2}P-5p\ ^{4}D^{\circ}\ 4s\ ^{2}P-5p\ ^{2}D^{\circ}\ 4s\ ^{2}P-5p\ ^{4}D^{\circ}\ 4s\ ^{2}P-5p\ ^{2}S^{\circ}\ 4s\ ^{2}P-5p\ ^{4}S^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
4661,22 4654,05 4623,96 4601,00 4580,47	18 10 10 20 3	9,28 9,20 9,28 9,28 9,28	11,94 11,86 11,96 11,97 11,69	$4s^{2}P - 5p^{2}P^{\circ} 4s^{2}P - 5p^{2}D^{\circ} 4s^{2}P - 4p'^{2}D^{\circ} 4s^{2}P - 5p^{2}P^{\circ} 4s^{4}P - 4p'^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
4578,47 4548,26 4526,20 4491,05 4475,31	$\frac{4}{30}$ $\frac{4}{10}$ $\frac{1}{15}$	9,03 8,98 9,20 9,20 8,98	11,74 11,71 11,94 11,96 11,76	$4s ext{ }^{4}P - 5p ext{ }^{4}P^{\circ}$ $4s ext{ }^{4}P - 4p' ext{ }^{2}P^{\circ}$ $4s ext{ }^{2}P - 5p ext{ }^{2}P^{\circ}$ $4s ext{ }^{2}P - 4p' ext{ }^{2}D^{\circ}$ $4s ext{ }^{4}P - 5p ext{ }^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4469,37 4446,41 4445,83 4438,48 4403,03	18 4 4 20 15	9,20 8,98 9,03 8,92 8,92	11,97 11,77 11,82 11,71 11,74	$4s^{2}P - 5p^{2}P^{\circ}$ $4s^{4}P - 5p^{4}P^{\circ}$ $4s^{4}P - 5p^{4}D^{\circ}$ $4s^{4}P - 5p^{4}P^{\circ}$ $4s^{4}P - 5p^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $

λ, Å	I	$E_{ m H},~{ m eV}$	$E_{ m B}$, eV	Transition	J
4402,58 4390,38 4389,76 4387,55 4379,90	4 7 25 6 20	9,03 9,03 8,92 9,03 8,98	11,84 11,85 11,74 11,85 11,82	$4s ^4P - 5p ^4D^{\circ}$ $4s ^4P - 5p ^2S^{\circ}$ $4s ^4P - 5p ^4D^{\circ}$ $4s ^4P - 5p ^4S^{\circ}$ $4s ^4P - 5p ^4D^{\circ}$	1/2 - 1/2 $1/2 - 1/2$ $5/2 - 7/2$ $1/2 - 3/2$ $3/2 - 3/2$
4371,55 4369,52 4363,30 4337,80 4326,12	5 15 20 1	8,92 9,03 8,98 8,98 8,98	11,76 11,86 11,83 11,84 11,85	$4s ^4P - 5p ^4D^{\circ}$ $4s ^4P - 5p ^2D^{\circ}$ $4s ^4P - 5p ^2D^{\circ}$ $4s ^4P - 5p ^4D^{\circ}$ $4s ^4P - 5p ^2S^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
4323,35 4280,43 4264,59 4226,44 4209,68	20 2 5 15 12	8,98 8,92 8,92 8,92 8,92	11,85 11,82 11,83 11,85 11,86	$4s ^4P - 5p ^4S^{\circ} \ 4s ^4P - 5p ^4D^{\circ} \ 4s ^4P - 5p ^2D^{\circ} \ 4s ^4P - 5p ^4S^{\circ} \ 4s ^4P - 5p ^2D^{\circ}$	3/2 - 3/2 $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 3/2$ $5/2 - 3/2$
4147,20 4139,00 4104,78 4032,14 4005,51	2 1 3 5	8,98 9,28 8,92 9,20 9,28	11,97 12,28 11,94 12,28 12,38	$4s ^4P - 5p ^2P^{\circ} \ 4s ^2P - 6p ^4D^{\circ} \ 4s ^4P - 5p ^2P^{\circ} \ 4s ^2P - 6p ^4D^{\circ} \ 4s ^2P - 6p ^2P^{\circ} \ $	3/2— $1/2$ $1/2$ — $3/2$ $5/2$ — $3/2$ $3/2$ — $3/2$ $1/2$ — $3/2$
3992 ,81 3944 ,79 3768 ,05 3703 ,03 3694 ,15	2 3 — —	9,20 8,98 9,03 8,92	 12,34 12,28 12,38 12,28	$\begin{array}{c} - \\ 4s\ ^2P-1^{\circ} \\ 4s\ ^4P-6p\ ^4D^{\circ} \\ 4s\ ^4P-6p\ ^2P^{\circ} \\ 4s\ ^4P-6p\ ^4D^{\circ} \end{array}$	$ \begin{array}{c}$
3691,58 1396,527 1389,961 1389,688 1379,529	 8 6 6 11	8,98 0,11 0,11 0,00 0,00	12,34 8,98 9,03 8,92 8,98	$4s ^4P - 1^{\circ}$ $3p ^2P^{\circ} - 4s ^4P$	3/2 $3/2$ $1/2$ $3/2$ $1/2$ $3/2$ $1/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $3/2$
1373,118 1363,449 1351,657 1347,238 1335,723	4 10 10 12 9	0,00 0,11 0,11 0,00 0,00	9,03 9,20 9,28 9,20 9,28	$3p^{2}P^{\circ}$ — $4s^{4}P$ $3p^{5}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5}^{2}P^{\circ}$ — $4s^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
1201,358 1188,768	11 12	$_{0,00}^{0,11}$	10,43 10,43	$3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$

Cl II, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^{4 \, 3} P_2$ Ionization potential $192000 \,$ cm $^{-1}$; $23,80 \,$ eV

λ, Å	I	$E_{\rm H}$, eV	$E_{\mathrm{B}},\;\mathrm{eV}$	Transition	J
9483,00 8820,70	2 5	18,73	20,04	3d' 3D°—4p" 3P	3—2
8391,96 8382,76	3 5 8	14,86 14,86 14,85	16,33 16,34 16,33	$3d \ ^{3}D^{\circ}-4p \ ^{3}P \ 3d \ ^{3}D^{\circ}-4p \ ^{3}P \ 3d \ ^{3}D^{\circ}-4p \ ^{3}P$	$ \begin{array}{c} 1 - 1 \\ 1 - 0 \\ 2 - 1 \end{array} $
8361,81 8360,63 8353,00	15 2	14,85 14,85 14,85	16,34 16,34	$3d \ ^{3}D^{\circ} - 4p \ ^{3}P$ $3d \ ^{3}D^{\circ} - 4p \ ^{3}P$	$ \begin{array}{c} 2-1 \\ 3-2 \\ 2-2 \end{array} $
7644,80	4	$\begin{cases} 18.74 \\ 19.78 \end{cases}$	20,36 21,40	$3d' \ ^3D^{\circ} - 1$ $4p'' \ ^1D - 4d' \ ^3F^{\circ}$	$\begin{array}{c} 2-2 \\ 1-2 \\ 2-3 \end{array}$
7620 ,51 7578 ,07	4 10	18,73 18,72	$20,36 \\ 20,36$	$\frac{3\dot{d}'}{3D}^{\circ}$ —1 $3\dot{d}'$ $^{3}D^{\circ}$ —1	$\begin{array}{c} 3-2 \\ 2-2 \end{array}$
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λ, Λ	I	E _H , eV	$E_{_{ m B}},{ m eV}$	Transition	J
7565,53 7389,28 7147,80 7074,98 6993,27	18 7 3 4 2	18,68 18,10 18,10 16,39	20,36 19,84 19,85 18,16	3d' ³ P°—1 3d" ³ P°— ³ P 3d" ³ P°— ³ P 3d' ³ G°—4p' ³ D	$ \begin{array}{c} 2-2 \\ 2-1 \\ 2-2 \\ 4-3 \end{array} $
6952,13	25	17,90	19,68	3d" 3F°-4p" 3D	$ \begin{array}{c} 2-1 \\ 2-2 \\ 3-2 \\ 3-3 \\ 1-2 \end{array} $
6930,45	4	17,90	19,68	3d" 3F°-4p" 3D	
6850,21	40	17,87	19,68	3d" 3F°-4p" 3D	
6841,86	10	17,87	19,69	3d" 3F°-4p" 3D	
6831,62	30	17,19	19,00	4s" 1P°-4p' 1D	
6759,42	35	17,85	19,69	$3d''' ^3F^{\circ} - 4p'' ^3D$	4—3
6713,43	40	16,39	18,23	$3d' ^3G^{\circ} - 4p' ^3F$	3—2
6686,04	45	16,39	18,24	$3d' ^3G^{\circ} - 4p' ^3F$	4—3
6681,03	15	16,39	18,24	$3d' ^3G^{\circ} - 4p' ^3F$	3—3
6661,68	75	16,39	18,25	$3d' ^3G^{\circ} - 4p' ^3F$	5—4
6653,75	25	16,39	18,25	3d' 3G°-4p' 3F	4-4
6522,38	10	18,16	20,06	4p' 3D-4d 3D°	3-3
6478,07	2	16,39	18,30	3d' 3G°-4p' 1F	4-3
6475,38	2	18,16	20,07	4p' 3D-4d 3D°	3-2
6465,32	3	18,14	20,06	4p' 3D-4d 3D°	2-3
6419,25	8	18,14	20,07	4p' 3D—4d 3D°	2—2
6417,59	2	18,14	20,07	4p' 3D—4d 3D°	1—2
6399,41	10	18,10	20,04	3d" 3P°—4p" 3P	2—2
6391,30	3	18,10	20,04	3d" 3P°—4p" 3P	2—1
6385,51	2	18,14	20,08	4p' 3D—4d 3D°	2—1
6384,13 6243,00 6227,18 6094,65 5922,33	5 2 6 100 7	18,14 13,96 13,96 16,00	20,08 15,95 15,95 18,03	4p' 3D—4d 3D° 4s 3S°—4p 5P 4s 3S°—4p 5P 4s' 1D°—4p' 1P —	1—1 1—1 1—2 2—1 —
5790,50	25	16,00	18,14	4s' 1D°-4p' 3D	2—1
5634,84	18	15,84	18,03	3d' 1P°-4p' 1P	1—1
5568,81	15	19,00	21,23	4p' 1D-5s' 1D°	2—2
5535,39	5	16,00	18,24	4s' 1D°-4p' 3F	2—3
5457,47	30	13,68	15,95	3d 5D°-4p 5P	0—1
5457,02	75	13,67	15,95	3d ⁵ D°-4p ⁵ P	1—1
5456,27	50	13,67	15,95	3d ⁵ D°-4p ⁵ P	2—1
5444,99	10	13,67	15,95	3d ⁵ D°-4p ⁵ P	1—2
5444,25	60	13,67	15,95	3d ⁵ D°-4p ⁵ P	2—2
5443,42	100	13,67	15,95	3d ⁵ D°-4p ⁵ P	3—2
5424,36	25	13,67	15,96	$3d ^5D^{\circ} - 4p ^5P$	2—3
5423,52	100	13,67	15,96	$3d ^5D^{\circ} - 4p ^5P$	3—3
5423,25	150	13,67	15,96	$3d ^5D^{\circ} - 4p ^5P$	4—3
5414,20	2	17,39	19,68	$3d '' ^1D^{\circ} - 4p'' ^3D$	2—1
5392,12	100	16,00	18,30	$4s' ^1D^{\circ} - 4p' ^1F$	2—3
5356,14 5338,92 5333,70 5285,48 5249,22	10 5 15 30 3	15,71 15,71 16,34 16,34	18,03 18,03 18,68 18,70	$-4s'\ ^3D^{\circ}-4p'\ ^1P \ 4s'\ ^3D^{\circ}-4p'\ ^1P \ 4p\ ^3P-3d'\ ^3P^{\circ} \ 4p\ ^3P-3d'\ ^3P^{\circ}$	2—1 1—1 2—2 2—1
5245,69 5221,34 5217,93 5193,03	4 75 150 10 25	16,33 13,96 13,96 13,96 16,34 16,33	18,70 16,33 16,34 16,34 18,72 18,72	$4p\ ^{3}P-3d'\ ^{3}P^{\circ}\ _{4s\ ^{3}S^{\circ}-4p\ ^{3}P}\ _{4s\ ^{3}S^{\circ}-4p\ ^{3}P}\ _{4s\ ^{3}S^{\circ}-4p\ ^{3}P}\ _{4p\ ^{3}P-3d'\ ^{3}D^{\circ}\ _{4p\ ^{3}P-3d'\ ^{3}D^{\circ}}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 2 - 2 \\ 1 - 2 \end{array} $
5189,70 5175,85	20	17,39 19,00	19,78 21,40	$3d'' ^{1}D^{\circ} - 4p'' ^{1}D$ $4p' ^{1}D - 4d' ^{3}F^{\circ}$	2—2 2—2 2—2

λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
5173,15	25	16,34	18,73	$4p\ ^3P-3d'\ ^3D^\circ \ 4p\ ^3P-3d'\ ^3D^\circ \ 4p\ ^3P-3d'\ ^3D^\circ \ 4s'\ ^3D^\circ-4p'\ ^3D$	2-3
5162,34	10	16,34	18,74		0-1
5158,79	8	16,33	18,74		1-1
5113,36	40	15,72	18,14		3-2
5104,08	25 125 100 20 150	15,71	18,14	$4s' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	2-1
5103,04		15,71	18,14	$4s' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	2-2
5099,30		15,71	18,14	$4s' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	1-1
5098,34		15,71	18,14	$4s' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	1-2
5078,25		15,72	18,16	$4s' \ ^{3}D^{\circ} - 4p' \ ^{3}D$	3-3
5068,10	10	15,71	18,16	4s' 3D°—4p' 3D	2—3
4995,52	60	15,68	18,16	3d' 3F°—4p' 3D	4—3
4970,12	50	15,65	18,14	3d' 3F°—4p' 3D	3—2
4943,24	1 5	17,28	19,78	3d' 1P°—4p'' 1D	1—2
4936,99	25	15,65	18,16	3d' 3F°—4p' 3D	3—3
4931,76	2	15,72	18,23	4s' 3D°—4p' 3F	3—2
4925,17	15	15,63	18,14	3d' 3F°—4p' 3D	2—1
4924,83	10	17,09	19,61	4s" 3P°—4p' 3S	2—1
4924,28	18	15,63	18,14	3d' 3F°—4p' 3D	2—2
4922,14	20	15,71	18,23	4s' 3D°—4p' 3F	2—2
4917,72	125	15,71	18,23	$4s' \ ^3D^{\circ} - 4p' \ ^3F$	1-2
4914,32	12	15,72	18,24	$4s' \ ^3D^{\circ} - 4p' \ ^3F$	3-3
4907,17	15	17,08	19,61	$4s'' \ ^3P^{\circ} - 4p'' \ ^3S$	1-1
4904,76	135	15,71	18,24	$4s' \ ^3D^{\circ} - 4p' \ ^3F$	2-3
4898,94	7	17,08	19,61	$4s'' \ ^3P^{\circ} - 4p'' \ ^3S$	0-1
4896,77	200	15,72	18,25	$4s' \ ^3D^{\circ} - 4p' \ ^3F$	3-4 $ 2-3 $ $ 0-1 $ $ 1-2 $ $ 2-2$
4891,62	4	15,63	18,16	$3d' \ ^3F^{\circ} - 4p' \ ^3D$	
4877,70	5	18,60	21,14	$4p' \ ^3P - 5s' \ ^3D^{\circ}$	
4857,04	10	18,59	21,14	$4p' \ ^3P - 5s' \ ^3D^{\circ}$	
4847,07	4	17,48	20,04	$3d'' \ ^3D^{\circ} - 4p'' \ ^3P$	
4842,44	$egin{array}{c} 8 \\ 20 \\ 2 \\ 3 \\ 2 \\ \end{array}$	17,48	20,04	$3d'' ^3D^{\circ} - 4p'' ^3P$	2—1
4836,79		15,68	18,24	$3d' ^3F^{\circ} - 4p' ^3F$	4—3
4833,50		20,04	22,61	$4p'' ^3P - 5s'' ^3P^{\circ}$	1—0
4829,23		20,04	22,61	$4p'' ^3P - 5s'' ^3P^{\circ}$	0—1
4821,87		16,00	18,57	$4s' ^1D^{\circ} - 4p' ^3P$	2—2
4820,95 4819,79 4819,46 4811,57 4810,06	$\begin{array}{c} 4 \\ 25 \\ 200 \\ 12 \\ 225 \end{array}$	{ 18,57 20,04 15,68 13,37 18,57 13,37	21,14 22,61 18,25 15,95 21,15 15,95	$4p' \ ^{3}P - 5s' \ ^{3}D^{\circ}$ $4p'' \ ^{3}P - 5s'' \ ^{3}P^{\circ}$ $3c'' \ ^{3}F^{\circ} - 4p' \ ^{3}F$ $4s \ ^{5}S^{\circ} - 4p \ ^{5}P$ $4p' \ ^{3}P - 5s' \ ^{3}D^{\circ}$ $4s \ ^{5}S^{\circ} - 4p \ ^{5}P$	2—2 2—1 4—4 2—1 2—3 2—2
4809,05	9	19,00	21,58	$4p' ^{1}D - 4d' ^{1}F^{\circ}$ $4p'' ^{3}P - 5s'' ^{3}P^{\circ}$ $4p'' ^{3}P - 5s'' ^{3}P^{\circ}$ $3d' ^{3}F^{\circ} - 4p' ^{3}F$ $4s ^{5}S^{\circ} - 4p ^{5}P$	2-3
4807,68	5	20,04	22,62		1-2
4803,16	2	20,04	22,62		2-2
4798,40	15	15,65	18,23		3-2
4794,54	250	13,37	15,96		2-3
4792,04	12	15,71	18,30	$4s' \ ^3D^{\circ} - 4p' \ ^1F$ $4s'' \ ^3P^{\circ} - 4p' \ ^3D$ $3d' \ ^3F^{\circ} - 4p' \ ^3F$ $4s'' \ ^3P^{\circ} - 4p'' \ ^3D$ $4s'' \ ^3P^{\circ} - 4p'' \ ^3D$	2-3
4785,44	50	17,09	19,68		2-2
4781,82	50	15,65	18,24		3-3
4781,32	75	17,09	19,69		2-3
4778,93	45	17,08	19,68		1-1
4776,38 4771,66 4771,09 4768,68 4765,30	5 20 40 150 10	17,45 17,19 17,08 17,08 15,65	20,04 19,78 19,68 19,68 18,25	$3d'' ^{3}D^{\circ} - 4p'' ^{3}P$ $4s'' ^{1}P^{\circ} - 4p'' ^{1}D$ $4s'' ^{3}P^{\circ} - 4p'' ^{3}D$ $4s'' ^{3}P^{\circ} - 4p'' ^{3}F$	1-0 1-2 0-1 1-2 3-4
4755,64 4753,49 4748,67	50 8 20	15,63 18,60 18,59	18,23 21,21 21,20	$\frac{3d'}{4p'}\frac{3F}{3P}$ $\frac{4p'}{5d}\frac{3P}{3D}$ $\frac{4p'}{3P}$ $\frac{3P}{5d}\frac{3D}{3D}$ $\frac{3P}{5d}\frac{3D}{3D}$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-2 \end{array} $

λ, Λ	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
4740 ,40 4739 ,42	150 10	47,39 15,63	20,00 18,24	3d" 1D°-4p" 1P 3d' 3F°-4p' 3F	2—1 2—3
4738,41 4721,43 4714,28 4676,73	10 25 8 8	$18,59 \\ 18,57 \\ 18,57 \\ 17,19 \\ 17,39$	21,21 21,20 21,20 19,84 20,04	$4p' \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4p' \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4p' \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4s'' \ ^{1}P^{\circ} - 3P$ $3d'' \ ^{1}D^{\circ} - 4p'' \ ^{3}P$	1-1 2-3 2-2 1-1 2-2
4624,36 4592,29 4585,03	6 2 15	47,08 16,34	19,78 19,04	4s" ³ P°-4p" ¹ D 4p ³ P-3d' ³ S°	$^{1-2}_{2-1}$
4584,28 4582,40 4572,13	20 8 100	$ \begin{smallmatrix} 16,33 \\ 16,34 \\ 16,34 \end{smallmatrix} $	19,04 19,05 19,05	$^{4p}_{^{3}P-3d'}^{^{3}S^{\circ}}_{^{4p}^{^{3}P-5s}}^{^{3}S^{\circ}}_{^{3}S-5s}^{^{3}S^{\circ}}$	1—1 2—1 0—1
4569 ,42 4544 ,48 4540 ,29	50 10 6	16,33 17,28	19,05 20,00 —	4p 3P—5s 3S° 3a″ 1P°—4p″ 1P —	1—1 1—1 —
4539 ,25 4536 ,78	$\frac{6}{20}$	17,08	19,82	4s" ³ P°— ³ P	1—0
4534,34 4519,19 4504,27 4497,30 4490,00	5 18 20 18 50	47,09 17,08 19,85 17,08 17,09		$4s'' 3P^{\circ} 3P$ $4s'' 3P^{\circ} 3P$ $3P - 5s'' 3P^{\circ}$ $4s'' 3P^{\circ} 3P$ $4s'' 3P^{\circ} 3P$	2—1 1—1 2—1 0—1 2—2
4482,02 4475,28 4468,48 4453,32 4436,96	10 20 2 3 3	19,85 { 17,08 { 19,84 19,84 19,84 19,82	22,62 19,85 22,61 22,61 22,62 22,61	$^{3}P - 5s'' \ ^{3}P^{\circ} - ^{3}P - ^{5}s'' \ ^{3}P^{\circ} - ^{3}S'' \ ^{3}P^{\circ} - ^{3}P^{\circ} - ^{3}S'' \ ^{3}P^{\circ} - ^{3}P^{$	$\begin{array}{c} 2-2 \\ 1-2 \\ 1-0 \\ 1-1 \\ 1-2 \\ 0-1 \end{array}$
4399,14 4372,91 4343,62 4336,26 4332,80	15 80 100 45 19	17,19 17,52 15,72 15,71 15,71	20,00 20,36 48,57 18,57 18,57	4s" ¹ P°—4p" ¹ P 3d" ³ D°—1 4s' ³ D°—4p' ³ P 4s' ³ D°—4p' ³ P 4s' ³ D°—4p' ³ P	$ \begin{array}{r} 1 - 1 \\ 3 - 2 \\ 3 - 2 \\ 2 - 2 \\ 1 - 2 \end{array} $
4309,06 4307,42 4304,07 4291,76 4276,51	50 75 40 50 30	17,48 15,71 15,71 15,71 18,25	20,36 18,59 18,59 18,60 21,15	$3d'' ^3D^{\circ}-1$ $4s' ^3D^{\circ}-4p' ^3P$ $4s' ^3D^{\circ}-4p' ^3P$ $4s' ^3D^{\circ}-4p' ^3P$ $4p' ^3F-5s' ^3D^{\circ}$	2-2 2-1 1-1 1-0 4-3
4270,61 4261,22 4259,52 4257,54 4253,51	25 20 35 4 75	18,24 $18,23$ $17,45$ $17,09$ $18,23$ $15,96$	21,14 21,14 20,36 20,00 21,14 18,87	$4p'\ ^3F - 5s'\ ^3D^{\circ}$ $4p'\ ^3F - 5s'\ ^3D^{\circ}$ $3d''\ ^3D^{\circ} - 1$ $4s''\ ^3P^{\circ} - 4p''\ ^1P$ $4p'\ ^3F - 5s'\ ^3D^{\circ}$ $4p\ ^5P - 5s\ ^5S^{\circ}$	3-2 $ 2-1 $ $ 1-2 $ $ 2-1 $ $ 2-2 $ $ 3-2$
4241,38 4235,49 4234,09 4233,60 4227,37	60 25 50 4 4	15,95 19,68 18,30 15,95 19,68 19,68	18,87 22,61 21,23 18,87 22,61 22,61	$4p^{5}P - 5s^{5}S^{\circ}$ $4p''^{3}D - 5s''^{3}P^{\circ}$ $4p'^{1}F - 5s'^{1}D^{\circ}$ $4p^{5}P - 5s^{5}S^{\circ}$ $4p''^{3}D - 5s''^{3}P^{\circ}$ $4p''^{3}D - 5s''^{3}P^{\circ}$	2—2 2—1 3—2 1—2 1—0 1—1
4224,92 4221,80 4218,76 4208,03 4205,07	15 3 4 30 10	19,69 19,68 — 17,09 18,25	22,62 22,62 — 20,04 21,20	$4p'' \ ^{3}D - 5s'' \ ^{3}P^{\circ}$ $4p'' \ ^{3}D - 5s'' \ ^{3}P^{\circ}$ $- 4s'' \ ^{3}P - 4p'' \ ^{3}P$ $4p'' \ ^{3}F - 5d' \ ^{3}D^{\circ}$	3-2 2-2 - 2-2 4-3

λ, Å	I	$E_{ m H}^{}$, eV	$E_{ m B},\;{ m eV}$	Transition	J
4204,54 4195,11 4192,24 4191,59 4188,82	18 18 6 15	17,09 17,08 18,24 17,08 17,08	20,04 20,04 21,20 20,04 20,04	$4s'' ^3P^{\circ} - 4p'' ^3P$ $4s'' ^3P^{\circ} - 4p'' ^3P$ $4p' ^3F - 5d ^3D^{\circ}$ $4s'' ^3P^{\circ} - 4p'' ^3P$ $4s'' ^3P^{\circ} - 4p'' ^3P$	2-1 1-2 3-3 1-1 1-0
4187,06 4186,63 4185,61 4184,89 4181,05	2 5 20 7 4	13,37 18,24 17,08 13,37	16,33 21,20 20,04 16,34	$4s {}^{5}S^{\circ} - 4p {}^{3}P$ $4p' {}^{3}F - 5d {}^{3}D^{\circ}$ $4s'' {}^{3}P^{\circ} - 4p'' {}^{3}P$ $4s {}^{5}S^{\circ} - 4p {}^{3}P$	2—1 3—2 0—1 2—2
4179,61 4170,66 4166,10 4157,98 4157,82	2 8 4 5 25	18,23 15,06 18,23	21,20 18,03 21,21	$4p' \ ^3F - 5d \ ^3D^{\circ}$ $3d' \ ^1D^{\circ} - 4p' \ ^1P$ $4p' \ ^3F - 5d \ ^3D^{\circ}$ -	2—3 2—1 2—1 —
4156,15 4153,98 4147,09 4143,04 4134,31	7 2 30 5 4	18,16 18,16 20,04 18,14	21,14 21,15 23,03 21,14	$4p'\ ^3D - 5s'\ ^3D^{\circ}$ $4p'\ ^3D - 5s'\ ^3D^{\circ}$ $4p''\ ^3P - 4d''\ ^3P^{\circ}$ $4p'\ ^3D - 5s'\ ^3D^{\circ}$	3—2 3—3 2—2 2—1
4133,66 4132,48 4130,86 4130,22 4125,96	20 200 25 8 3	18,14 16,00 18,14 18,14 20,04	21,14 19,00 21,14 21,14 23,04	$4p'\ ^3D - 5s'\ ^3D^\circ$ $4s'\ ^1D^\circ - 4p'\ ^1D$ $4p'\ ^3D - 5s'\ ^3D^\circ$ $4p'\ ^3D - 5s'\ ^3D^\circ$ $4p''\ ^3P - 4d''\ ^3D^\circ$	1—1 2—2 2—2 1—2 2—3
4124,00 4118,84 4079,88 4077,93 4074,51	12 4 15 4 6	18,14 19,61 18,16 19,85 18,16	21,15 22,62 21,20 22,89 21,20	$4p'\ ^3D - 5s'\ ^3D^\circ \ 4p''\ ^3S - 5s''\ ^3P^\circ \ 4p'\ ^3D - 5d\ ^3D^\circ \ ^3P - 4d''\ ^3F^\circ \ 4p'\ ^3D - 5d\ ^3D^\circ \ $	2—3 1—2 3—3 2—2 3—2
4057,52 4055,46 4054,18 4052,22 4051,58	6 4 9 12 4	18,14 19,84 18,14 18,14	21 ,20 22 ,89 21 ,20 21 ,20	$4p' \ ^3D - 5d \ ^3D^{\circ}$ $^3P - 4d'' \ ^3F^{\circ}$ $4p' \ ^3D - 5d \ ^3D^{\circ}$ $4p' \ ^3D - 5d \ ^3D^{\circ}$	$ \begin{array}{c} 2-3 \\ 1-2 \\ 2-2 \\ 1-2 \end{array} $
4044,65 4044,09 4040,64 4036,53 4025,68	4 9 9 10 7	18,14 18,14 18,16 18,60 18,59	21 ,21 21 ,21 21 ,23 21 ,67 21 ,67	4p' 3D—5d 3D° 4p' 3D—5d 3D° 4p' 3D—5s' 1D° 4p' 3P—4d' 3D° 4p' 3P—4d' 3D°	2—1 1—1 3—2 0—1 1—1
4020,06 4018,24 3995,24 3990,19 3988,17	15 3 6 20 4	18,59 18,14 18,57 18,57 18,03	21,67 21,23 21,67 21,68 21,14	4p' 3P-4d' 3D° 4p' 3D-5s' 1D° 4p' 3P-4d' 3D° 4p' 3P-4d' 3D° 4p' 1P-5s' 3D°	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-2 \\ 2-3 \\ 1-2 \end{array} $
3981 ,94 3971 ,18 3954 ,21 3949 ,96 3928 ,63	15 7 20 10 5			$ 4p' ^1D - 4d' ^1D^{\circ}$ $4p ^3P - 3p^5 4s ^3P^{\circ}$ $4p' ^3F - 4d' ^3F^{\circ}$	
3927,88 3921,75 3917,57 3916,70 3915,82	6 3 18 20 3	18,25 15,08 18,23 18,24 15,84	21,40 18,24 21,40 21,40 19,00	$4p'\ ^3F$ — $4d'\ ^3F°$ $3d'\ ^1F°$ — $4p'\ ^3F$ $4p'\ ^3F$ — $4d'\ ^3F°$ $4p'\ ^3F$ — $4d'\ ^3F°$ $3d'\ ^1P°$ — $4p'\ ^1D$	4-3 3-3 2-2 3-3 1-2
3913,92 3910,60 3905,80	30 2 4	18,25 15,08 18,23	21,42 18,25 21,40	4p' 3F—4d' 3F° 3d' 1F°—4p' 3F 4p' 3F—4d' 3F°	4—4 3—4 2—3

λ, Α	I	$E_{ m H},~{ m eV}$	$E_{ m B},~{ m eV}$	Transition	J
3902,84 3901,89	9 5	18,24 19,85	21,42 23,03	$4p' {}^3F - 4d' {}^3F^{\circ} \ {}^3P - 4d'' {}^3P^{\circ}$	$\frac{3-4}{2-2}$
3901,12 3899,27 3894,55 3886,63 3883,80	4 4 2 4 12	14,86 18,30 14,85 19,85 18,03	18,03 21,48 18,03 23,04 21,23	$3d\ ^3D^{\circ}-4p'\ ^1P \ 4p'\ ^1F-4d'\ ^3G^{\circ} \ 3d\ ^3D^{\circ}-4p'\ ^1P \ ^3P-4d''\ ^3D^{\circ} \ 4p'\ ^1P-5s'\ ^1D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 4 \\ 2 - 1 \\ 2 - 3 \\ 1 - 2 \end{array} $
3868,62	40	19,69	22,89	$4p'' \ ^3D - 4d'' \ ^3F^\circ \ 4p'' \ ^3D - 4d'' \ ^3F^\circ \ 4p'' \ ^3D - 4d'' \ ^3F^\circ \ 4p \ ^5P - 4d' \ ^5D^\circ \ 4p \ ^5P - 4d' \ ^5D^\circ \ $	3-4
3864,60	15	19,69	22,89		3-3
3861,95	20	19,68	22,89		2-3
3861,40	50	15,96	19,17		3-2
3860,98	100	15,96	19,17		3-3
3860,80 3860,05 3859,17 3854,75 3851,69	150 2 7 15 30	15,96 16,34 16,34 19,84 19,68 15,95	19,17 19,55 19,55 23,05 22,89 19,17	$4p ^5P - 4d ^5D^{\circ}$ $4p ^3P - 3p ^54s ^3P^{\circ}$ $4p ^3P - 3p^54s ^3P^{\circ}$ $^3P - 4d'' ^3P^{\circ}$ $4p'' ^3D - 4d'' ^3F^{\circ}$ $4p ^5P - 4d ^5D^{\circ}$	3-4 2-1 0-1 1-1 1-2 2-1
3851,38	75	15,95	19,17	$4p^{5}P-4d^{5}D^{\circ}$ $4p^{5}P-4d^{5}D^{\circ}$ $3d'^{1}F^{\circ}-4p'^{1}F$ $4p^{5}P-4d^{5}D^{\circ}$ $4p^{5}P-4d^{5}D^{\circ}$	2-2
3850,97	100	15,95	19,17		2-3
3849,33	3	15,08	18,30		3-3
3845,84	30	15,95	19,17		1-0
3845,69	75	15,95	19,17		1-1
3845,42	50	15,95	19,17	4p ⁵ P-4d ⁵ D°	$ \begin{array}{r} 1-2 \\ 1-0 \\ 4-4 \\ 4-5 \\ 3-3 \\ \end{array} $
3843,26	100	17,28	20,50	3d" ¹ P°-4p" ¹ S	
3838,37	20	18,25	21,48	4p' ³ F-4d' ³ G°	
3833,40	200	18,25	21,48	4p' ³ F-4d' ³ G°	
3830,80	15	18,24	21,48	4p' ³ F-4d' ³ G°	
3829,27	15	15,06	18,30	$3d' ^{1}D^{\circ} - 4p' ^{1}F$	2—3
3827,62	150	18,24	21,48	$4p' ^{3}F - 4d' ^{3}G^{\circ}$	3—4
3820,25	100	18,23	21,48	$4p' ^{3}F - 4d' ^{3}G^{\circ}$	2—3
3818,40	30	18,16	21,40	$4p' ^{3}D - 4d' ^{3}F^{\circ}$	3—3
3810,10	30	18,14	21,40	$4p' ^{3}D - 4d' ^{3}F^{\circ}$	2—2
3809,51	40	18,14	21,40	$4p' \ ^3D - 4d' \ ^3F^{\circ} \ 4p' \ ^3D - 4d' \ ^3F^{\circ} \ 4p' \ ^3D - 4d' \ ^3F^{\circ} \ - \ 4p' \ ^1F - 4d' \ ^1F^{\circ}$	1-2
3805,24	75	18,16	21,42		3-4
3798,80	50	18,14	21,40		2-3
3793,75	25	—	—		-
3781,23	30	18,30	21,58		3-3
3776,20	4	15,72	19,00	$4s' \ ^3D^{\circ} - 4p' \ ^1D$	3—2
3774,25	25	14,86	18,14	$3d \ ^3D^{\circ} - 4p' \ ^3D$	1—1
3773,68	20	14,86	18,14	$3d \ ^3D^{\circ} - 4p' \ ^3D$	1—2
3769,13	20	14,85	18,14	$3d \ ^3D^{\circ} - 4p' \ ^3D$	3—2
3768,13	18	14,85	18,14	$3d \ ^3D^{\circ} - 4p' \ ^3D$	2—1
3767,57	30	14,85	18,14	$3d ^{3}D^{\circ} - 4p' ^{3}D$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 3-3 \\ 2-3 \\ 1-0 \end{array} $
3756,92	2	19,00	22,30	$4p' ^{1}D - 4d' ^{1}P^{\circ}$	
3750,00	30	14,85	18,16	$3d ^{3}D^{\circ} - 4p' ^{3}D$	
3748,46	15	14,85	18,16	$3d ^{3}D^{\circ} - 4p' ^{3}D$	
3738,76	4	17,19	20,50	$4s'' ^{1}P^{\circ} - 4p'' ^{1}S$	
3733,73	10	18,16	21,48	$4p' \ ^3D - 4d' \ ^3G^{\circ}$ $4p' \ ^3D - 4d' \ ^3G^{\circ}$ $4p'' \ ^3D - 4d'' \ ^3P^{\circ}$ $4p'' \ ^3D - 4d'' \ ^3F^{\circ}$	3-4
3717,94	15	18,14	21,48		2-3
3705,54	2	19,69	23,03		3-2
3691,88	5	19,69	23,04		3-3
3688,44	15	18,03	21,40		1-2
3673,83 3669,46 3668,03 3659,84 3658,38	$ \begin{array}{r} 18 \\ 2 \\ 20 \\ 18 \\ 20 \end{array} $	14,86 14,85 14,85 14,85 14,85	18,23 18,23 18,23 18,24 18,24	$3d \ ^{3}D^{\circ}-4p' \ ^{3}F$	1-2 3-2 2-2 3-3 2-3

			_		
λ, λ	I	$E_{\rm II}$, eV	E_{B} , eV	Transition	J
3650,13 3648,07 3639,19 3623,79	30 10 18 9	14,85 18,60 18,59 19,61	18,25 22,00 22,00 23,03	$3d\ ^{3}D^{\circ}$ — $4p'\ ^{3}F$ $4p'\ ^{3}P$ — $4d'\ ^{3}S^{\circ}$ $4p'\ ^{3}P$ — $4d'\ ^{3}S^{\circ}$ $4p''\ ^{3}S$ — $4d''\ ^{3}P^{\circ}$	3-4 0-1 1-1 1-2
3618,88 3615,09 3610,07 3609,75 3605,61 3605,39	15 10 12 4 7 5	18,57 18,25 — 18,24 18,24 19,61	22,00 21,68 — 21,67 21,68 23,05	$4p'\ ^3P-4d'\ ^3S^\circ$ $4p'\ ^3F-4d'\ ^3D^\circ$ $ 4p'\ ^3F-4d'\ ^3D^\circ$ $4p'\ ^3F-4d'\ ^3D^\circ$ $4p'\ ^3F-4d'\ ^3P^\circ$	$ \begin{array}{c} 2-1 \\ 4-3 \\ - \\ 3-2 \\ 3-3 \\ 1-1 \end{array} $
3604,92 3604,51 3603,72 3600,42 3595,82	3 15 10 5 8	18,23 18,60 18,59 18,23 18,59	21,67 22,04 22,03 21,67 22,04	$4p'\ ^3F - 4d'\ ^3D^\circ$ $4p'\ ^3P - 4d'\ ^3P^\circ$ $4p'\ ^3P - 4d'\ ^3P^\circ$ $4p'\ ^3F - 4d'\ ^3D^\circ$ $4p'\ ^3P - 4d'\ ^3P^\circ$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 1-0 \\ 2-2 \\ 1-1 \end{array} $
3587,78 3576,00 3568,04 3526,13 3522,14	12 15 20 30 40	18,59 18,57 18,57 18,16 18,16	22,05 22,04 22,05 21,67 21,68	4p' 3P-4d' 3P° 4p' 3P-4d' 3P° 4p' 3P-4d' 3P° 4p' 3D-4d' 3D° 4p' 3D-4d' 3D°	1-2 2-1 2-2 3-2 3-3
3513,69 3513,22 3509,39 3508,94 3505,44	12 35 40 12 12	18,14 18,14 18,14 18,14 18,14	21,67 21,67 21,67 21,67 21,68	$4p'\ ^3D - 4d'\ ^3D^\circ \ 4p'\ ^3D - 4d'\ ^3D^\circ \ $	$ \begin{array}{c} 2-1 \\ 1-1 \\ 2-2 \\ 1-2 \\ 2-3 \end{array} $
3479,82 3448,14 3409,92 3405,89 3353,39	30 4 5 3 125	18,03 18,03 14,34	21 ,67 21 ,67 21 ,67 18 ,03	$\begin{array}{c} -\\ 4p' {}^{1}P - 4d' {}^{3}D^{\circ} \\ 4p' {}^{1}P - 4d' {}^{3}D^{\circ} \\ 3p^{5} {}^{1}P^{\circ} - 4p' {}^{1}P \end{array}$	 1-1 1-2 1-1
3350,07 3337,20 3333,64 3332,42 3329,12	4 3 40 15 150	14,86 14,85 14,85 16,34	18,57 18,57 18,57 20,06	3d 3D°-4p′ 3P 3d 3D°-4p′ 3P 3d 3D°-4p′ 3P 4p 3P-4d 3D°	$ \begin{array}{c} 2 \\ 3-2 \\ 2-2 \\ 2-3 \end{array} $
3320,14 3316,86 3315,44 3312,78	30 50 100 15	$14,86 \\ 16,34 \\ \{ 16,33 \\ 14,85 \\ 14,86 $	18,59 20,07 20,07 18,59 18,60	$3d ^3D^{\circ}-4p' ^3P$ $4p ^3P-4d ^3D^{\circ}$ $4p ^3P-4d ^3D^{\circ}$ $3d ^3D^{\circ}-4p' ^3P$ $3d ^3D^{\circ}-4p' ^3P$	$egin{array}{c} 1 - 1 \\ 2 - 2 \\ 1 - 2 \\ 2 - 1 \\ 1 - 0 \end{array}$
3307,90 3306,45 3276,81 3231,75 3222,55 3203,05	50 40 40 12 7 20	16,34 16,33 16,00 18,30	20,08 20,08 19,78 22,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 0-1 1-1 2-2 3-2 -
3202 ,42 3189 ,04 3187 ,42 3181 ,70 3181 ,26	6 20 5 7 5	18,16 18,14 18,14 18,14	22,05 22,03 22,04 22,04	$-4p'\ ^3D-4d'\ ^3P^\circ \ 4p'\ ^3D-4d'\ ^3P^\circ \ 4p'\ ^3D-4d'\ ^3P^\circ \ 4p'\ ^3D-4d'\ ^3P^\circ$	$\begin{array}{c} - \\ 3-2 \\ 1-0 \\ 2-1 \\ 1-1 \end{array}$
3180,43 3176,95 3175,30 3173,66 3172,56 3170,23	7 5 6 20 6 15	18,14 — —	22,05 — —	4p' 3D-4d' 3P°	2—2 ——————————————————————————————————
3169,45 3161,44 314	7 20	15,08	19,00	3d' 1F°-4p' 1D	

λ, Α	I	$E_{ m H}$, eV	$E_{_{f B}},\;{f eV}$	Transition	J
3160,52 3147,86	10 20		19,00		 2—2
3125,96 3125,44 3124,28	5 6 6	15,71 15,72 15,71	19,68 19,68 19,68	4s' 3D°—4p" 3D 4s' 3D°—4p" 3D 4s' 3D°—4p" 3D	2—1 3—2 1—1
3123,72 3121,62	15 10	15,72 15,71	19,69 19,68	4s' 3D°—4p" 3D 4s' 3D°—4p" 3D	3-3 2-2 2-3
3119,82 3096,72 3092,90	12 25 8	{ 15,71 15,71 16,00	19,69 19,68 20,00	4s' ³ D°—4p" ³ D 4s' ³ D°—4p" ³ D 4s' ¹ D°—4p" ¹ P	2-3 1-2 2-1
3092,22 3071,35	50 4 0	15,68 15,65	19,69 19,68	$3d' {}^{3}F^{\circ} - 4p'' {}^{3}D$ $3d' {}^{3}F^{\circ} - 4p'' {}^{3}D$	4—3 3—2
3069,66 3058,00 3053,74 3045,00 3037,98	5 40 10 10 35	15,65 15,63 15,63 15,71 17,52	19,69 19,68 19,68 19,78 21,60	$3d' \ ^3F^{\circ}-4p'' \ ^3D$ $3d' \ ^3F^{\circ}-4p'' \ ^3D$ $3d' \ ^3F^{\circ}-4p'' \ ^3D$ $4s' \ ^3D^{\circ}-4p'' \ ^1D$ $3d'' \ ^3D^{\circ}-2$	3-3 $ 2-1 $ $ 2-2 $ $ 2-2 $ $ 3-2$
3022,93 3018,82 3006,98 3006,05 3004,39	30 12 20 20 10	18,03 15,71 17,48 15,71 15,71	22,13 19,82 21,60 19,84 19,84	$4p' ^{1}P - 4d' ^{1}D^{\circ}$ $4s' ^{3}D^{\circ} - ^{3}P$ $3d'' ^{3}D^{\circ} - 2$ $4s' ^{3}D^{\circ} - ^{3}P$ $4s' ^{3}D^{\circ} - ^{3}P$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 2-2 \\ 2-1 \\ 1-1 \end{array} $
2996,63 2993,09 2982,78 2980,90 2980,47	40 8 18 4 2	15,72 15,71 17,45 18,14 15,63	19,85 19,85 21,60 22,30 19,78	4s' 3D°—3P 4s' 3D°—3P 3d" 3D°—2 4p' 3D—4d' 1P° 3d' 3F°—4p" 1D	3-2 $ 2-2 $ $ 1-2 $ $ 1-1 $ $ 2-2$
2978,48 2973,46 2972,63 2964,21 2950,35	7 2 5 2 5	15,84 13,96 19,00	20,00 - 18,14 23,20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} - \\ 1-1 \\ - \\ 1-2 \\ 2-2 \end{array}$
2934,60 2912,06 2906,25	5 15 20	18,03	22,30	- 4p' ¹ P-4d' ¹ P°	_ _ 1—1
2902 ,45 2887 ,41	4 4	$ \begin{array}{c} - \\ 11,65 \\ 15,71 \end{array} $	15,95 20,00	$3p^{5} ^{3}P^{\circ} - 4p ^{5}P \ \ 4s' ^{3}D^{\circ} - 4p'' ^{1}P$	1—1 1—1
2884,01 2876,42 2868,41 2865,21 2863,55	2 5 10 4 7	11,65 15,72 15,71 15,71	15,95 20,04 20,04 20,04	$3p^{5} ^{3}P^{\circ} - ^{4}p ^{5}P$ $ 4s' ^{3}D^{\circ} - ^{4}p'' ^{3}P$ $4s' ^{3}D^{\circ} - ^{4}p'' ^{3}P$ $4s' ^{3}D^{\circ} - ^{4}p'' ^{3}P$	1—2 ———————————————————————————————————
2862,06 2860,71 2844,28 2835,59 2832,33	5 5 4 3 4	15,71 15,71 — 11,58 11,58	20,04 20,04 — 15,95 15,95	$4s' \ ^{3}D^{\circ} - 4p'' \ ^{3}P$ $4s' \ ^{3}D^{\circ} - 4p'' \ ^{3}P$ $- 3p^{5} \ ^{3}P^{\circ} - 4p \ ^{5}P$ $3p^{5} \ ^{3}P^{\circ} - 4p \ ^{5}P$	$ \begin{array}{c} 1-1 \\ 1-0 \\ - \\ 2-1 \\ 2-2 \end{array} $
2800,27 2799,60 2763,88 2758,69 2754,10	$\begin{array}{c} 4 \\ 4 \\ 10 \\ 5 \\ 25 \end{array}$	 	 	- - - -	
2751 ,52 2719 ,61 2714 ,38	5 4 8	13,67 13,67	18,23 18,24	3d ⁵ D°—4p′ ³ F 3d ⁵ D°—4p′ ³ F	3—2 3—3

					1
λ, Λ	I	E _H , eV	EB, eV	Transition	J
2712 ,77 2709 ,82	4 2	 18,59	23,16	' _{1p'} ³ P—6s' ³ D°	_ 1—1
2709,60 2709,03	4 10	13,67	18,25		- 44
2706,76 2698,56 2694,63	$egin{array}{c} 4 \ 2 \ 3 \end{array}$	$\frac{-}{18,57}$ $\frac{18,57}{18,57}$	$\begin{array}{c} -23,16 \\ 23,17 \end{array}$	$\frac{-}{4p'}\frac{^{3}P-6s'}{^{3}P-6s'}\frac{^{3}D^{\circ}}{^{3}D^{\circ}}$	2—1 2—3
2689,39 2688,04	$\begin{array}{c} 6 \\ 150 \end{array}$		18,57	4s 3S°-4p′ 3P	$\frac{-}{1-2}$
2679,37 $2676,95$ $2672,19$	5 100 50	13,96 13,96	 18,59 18,60		1—1 1—0
2671,43 2667,36	6 40	11,70 , 16,34	16,33 20,98	$3p^{5} {}^{3}P^{\circ} - 4p {}^{3}P$ $4p {}^{3}P - 6s {}^{3}S^{\circ}$	0—1 2—1
2666;46 2658;74 2648;19	20 100 10	16,34 16,33 14,34	20,98 20,98 19,00	4p 3P-6s 3S° 4p 3P-6s 3S° 3p ⁵ 1P°-4p' 1D	0—1 1—1 1—2 —
2647,79 2646,88	5 25	11,65 11,65	16,33 16,34	$3p^{5} ^{3}P^{\circ} - 4p ^{3}P$ $3p^{5} ^{3}P^{\circ} - 4p ^{3}P$	1—1 1—2
2642,28 2634,95 2631,33	4 12 2	11,65 15,08 15,65	16,34 	$3p^{5} {}^{3}P^{\circ} - 4p {}^{3}P$ $ 3d' {}^{1}F^{\circ} - 4p'' {}^{1}D$ $3d' {}^{3}F^{\circ} - 1$	1—0 — 3—2 3—2
2630,20 2621,87 2619,80 2615,13 2614,65	4 4 4 10 5	18,16 —	22,89 —	- 4p' ³ D-4d" ³ F° -	
2608,72 2608,24 2605,67 2604,48 2603,36	2 2 5 8 10	18,14 18,14 — 11,58 11,58	22,89 22,89 — 16,33 16,34	$4p' \ ^{3}D - 4d'' \ ^{3}F^{\circ}$ $4p' \ ^{3}D - 4d'' \ ^{3}F^{\circ}$ $3p^{5} \ ^{3}P^{\circ} - 4p \ ^{3}P$ $3p^{5} \ ^{3}P^{\circ} - 4p \ ^{3}P$	$ \begin{array}{ccc} 2-3 \\ 1-2 \\ - \\ 2-1 \\ 2-2 \end{array} $
2580,40 2571,10 2568,25 2568,13 2566,01	4 8 3 4 5	14,86 14,85 14,86 14,85	19,68 19,68 19,68 19,68	$\begin{array}{c} - \\ 3d \ ^3D° - 4p" \ ^3D \end{array}$	1—1 2—1 1—2 3—2
2565 ,29 2564 ,84 2564 ,13 2549 ,85 2547 ,76	15 20 6 50 12	14,85 14,85 14,85 16,34 16,34	19,68 19,69 19,69 21,20 21,20	$3d ^3D^{\circ} - 4p'' ^3D$ $3d ^3D^{\circ} - 4p'' ^3D$ $3d ^3D^{\circ} - 4p'' ^3D$ $4p ^3P - 5d ^3D^{\circ}$ $4p ^3P - 5d ^3D^{\circ}$	2-2 3-3 2-3 2-3 2-2
2546,94 2544,84 2543,98 2518,15 2515,92	20 15 10 4 3	16,33 16,34 16,33 18,25 18,24	21,20 21,21 21,21 23,17 23,17	4p ³ P-5d ³ D° 4p ³ P-5d ³ D° 4p ³ P-5d ³ D° 4p' ³ F-6s' ³ D° 4p' ³ F-6s' ³ D°	1-2 0-1 1-1 4-3 3-2
2514,01 2512,41 2511,33 2502,75 2498,53	3 2 3 40 30	44,85 18,23 18,23 15,99 15,95	19,78 23,16 23,17 20,91 20,91	$3d\ ^3D^{\circ}$ — $4p''\ 'D$ $4p'\ ^3F$ — $6s'\ ^3D^{\circ}$ $4p'\ ^3F$ — $6s'\ ^3D^{\circ}$ $4p\ ^5P$ — $6s\ ^5S^{\circ}$ $4p\ ^5P$ — $6s\ ^5S^{\circ}$	3-2 2-1 2-2 3-2 2-2
2496,04 2472,69 2466,72 2459,86 2452,30	20 3 2 10 10	15,95 18,16 18.14	20,94 23,17 23,17 ————————————————————————————————————	4p ⁵ P - 6s ⁵ S° 4p' ³ D - 6s' ³ D° 4p' ³ D - 6s' ³ D° -	1-2 3-3 2-2 -

λ. Å	I	$E_{ m H}^{},~{ m eV}$	E _B eV	Transition	J
2445,34 2444,12 2440,49 2440,33	20 7 4 5	 	_ _ _ _		
2434,10	50	$\left\{ \begin{array}{l} 15,96 \\ 15,96 \end{array} \right.$	21,05 21,05	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3—4 3—3
2430,16	30	$\left\{ egin{array}{l} 15,95 \\ 15,95 \end{array} \right.$	21,05 21,05	4p ^{5}P — 5d $^{5}D^{\circ}$ 4p ^{5}P — 5d $^{5}D^{\circ}$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$
2428,02 2427,79 2424,01 2419,85	10 20 10 4	15,95 	21,05 —	$4p {}^{5}P - 5d^{5}D^{\circ}$	1—2 — —
2412,48 2407,10 2404,59 2403,87 2399,85	10 5 5 3 3	- - - -	_ _ _ _		_ _ _ _
2398,91 2340,60 2323,02 2322,00 2321,28	2 2 4 1 1	18,03 15,06 — 16,34 16,33	23,20 20,36 — 21,67 21,67	$ \begin{array}{c} 4p' {}^{1}P - 6s' {}^{1}D^{\circ} \\ 3d' {}^{1}D^{\circ} - 1 \\ - \\ 4p {}^{3}P - 4d' {}^{3}D^{\circ} \\ 4p {}^{3}P - 4d' {}^{3}D^{\circ} \end{array} $	$egin{array}{c} 1-2 \\ 2-2 \\ - \\ 2-2 \\ 1-2 \\ \end{array}$
2320,25 2288,17 2276,25 2253,16 2251,50	2 7 4 30 40	16,34 — — 14,86 14,85	21,68 <u>—</u> 20,36 20,36	$4p ^3P - 4d' ^3D^\circ$ $ 3d ^3D^\circ - 1$ $3d ^3D^\circ - 4$	2—3 — 1—2 3—2
2250,96 2109,37 2102,99 1923,35 1883,14	20 2 3 4 3	14,85 13,96 13,96 11,70 11,58	20,36 19,84 19,85 18,14 18,16	$3d \ ^{3}D^{\circ}-1$ $4s \ ^{3}S^{\circ}-^{3}P$ $4s \ ^{3}S^{\circ}-^{3}P$ $3p^{5} \ ^{3}P^{\circ}-^{4}p' \ ^{3}D$ $3p^{5} \ ^{3}P^{\circ}-^{4}p' \ ^{3}D$	2-2 1-1 1-2 0-1 2-3
1791,91 1787,10 1785,06 1772,01 1767,24	4 3 1 3 1	11,65 11,65 11,65 11,58 11,58	18,57 18,59 18,60 18,57 18,59	$3p^{5} ^{3}P^{\circ} - 4p' ^{3}P$ $3p^{5} ^{3}P^{\circ} - 4p' ^{3}P$ $3p^{5} ^{3}P^{\circ} - 4p' ^{3}P$ $3p^{5} ^{3}P^{\circ} - 4p' ^{3}P$ $3p^{5} ^{3}P^{\circ} - 4p' ^{3}P$	1-2 $1-1$ $1-0$ $2-2$ $2-1$
1558,05 1528,91 1471,06 1223,71 1079,08	1 1 2 2 15	11,65 11,58 11,58 1,44 0,09	19,61 19,68 20,00 11,58 11,58	$3p^{5} ^{3}P^{\circ} - 4p'' ^{3}S$ $3p^{5} ^{3}P^{\circ} - 4p'' ^{3}D$ $3p^{5} ^{3}P^{\circ} - 4p'' ^{1}P$ $3p^{4} ^{1}D - 3p^{5} ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3p^{5} ^{3}P^{\circ}$	1—1 2—2 2—1 2—2 1—2
1075,24 1071,76 1071,05 1067,94 1063,83	7 10 20 4 10	0,12 0,09 0,00 0,09 0,00	11,65 11,65 11,58 11,70 11,65	$\begin{array}{c} 3p^4 \ ^3P - 3p^5 \ ^3P^\circ \\ 3p^4 \ ^3P - 3p^5 \ ^3P^\circ \end{array}$	0-1 1-1 2-2 1-0 2-1
961,49 914,90 895,95 893,56 888,07	10 2 3 3 4	1,44 0,12 0,12 0,09 0,00	14,34 13,67 13,96 13,96 13,96	$3p^4 ^1D - 3p^5 ^1P^\circ$ $3p^4 ^3P - 3d ^5D^\circ$ $3p^4 ^3P - 4s ^3S^\circ$ $3p^4 ^3P - 4s ^3S^\circ$ $3p^4 ^3P - 4s ^3S^\circ$	2—1 0—1 0—1 1—1 2—1
864,67 851,70 841,41 839,63 839,30 834,67	5 7 4 2 2 10	0,00 1,44 0,12 0,09 0,09 0,00 0,00	14,34 16,00 14,86 14,85 14,86 14,85 15,06	$3p^4 \ ^3P - 3p^5 \ ^1P^\circ$ $3p^4 \ ^3D - 4s' \ ^1D^\circ$ $3p^4 \ ^3P - 3d \ ^3D^\circ$ $3p^4 \ ^3P - 3d' \ ^1D^\circ$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 0-1 \\ 1-2 \\ 1-1 \\ 2-3 \\ 1-2 \end{array} $
827,85	1	0,00	10,00	Vr 2 00 =	

	λ, Α	I	$E_{\mathrm{H}}^{}$, eV	E _B , eV	Transition	J
	795,36 793,47 793,34	2 3 3	0,12 0,09 0,09	15,71 15,71 15,71	$3p^4 \ ^3P - 4s' \ ^3D^{\circ}$ $3p^4 \ ^3P - 4s' \ ^3D^{\circ}$ $3p^4 \ ^3P - 4s' \ ^3D^{\circ}$	0-1 $1-1$ $1-2$
	792,19 789,01 788,75 787,62 787,15	2 7 4 3 1	1,44 0,00 0,00 1,44 0,09	17,09 15,71 15,72 17,19 15,84	$3p^{4} ^{1}D - 4s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 4s'' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 4s'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 3d' ^{1}P^{\circ}$	2—2 2—2 2—3 2—1 1—1
	777,55 730,92 729,52 729,39 728,94	3 3 2 3 3	1,44 0,12 0,09 0,09 0,09	17,39 17,08 17,08 17,08 17,09	$3p^4 ^1D - 3d'' ^1D^{\circ}$ $3p^4 ^3P - 4s'' ^3P^{\circ}$ $3p^4 ^3P - 4s'' ^3P^{\circ}$ $3p^4 ^3P - 4s'' ^3P^{\circ}$ $3p^4 ^3P - 4s'' ^3P^{\circ}$	2—2 0—1 1—0 1—1 1—2
	725,64 725,27 719,26 717,15 715,58	2 3 1 2 3	0,00 0,00 1,44 1,44 0,12	17,08 17,09 18,68 18,73 17,45	$3p^4 \ ^3P - 4s'' \ ^3P^e \ 3p^4 \ ^3P - 4s'' \ ^3P^o \ 3p^4 \ ^1D - 3d' \ ^3P^o \ 3p^4 \ ^3P - 3d'' \ ^3D^o \ 3p^4 \ ^3P - 3d'' \ ^3D^o$	2—1 2—2 2—2 2—3 0—1
	714,03 712,66 709,16 707,43 687,55	2 3 2 4 1	0,09 0,09 0,00 0,00 1,44	17,45 17,48 17,48 17,52 19,47	$3p^4 \ ^3P - 3d'' \ ^3D^{\circ}$ $3p^4 \ ^1D - 3p^5 4s \ ^3P^{\circ}$	1-1 1-2 2-2 2-3 2-2
	667,49 666,17 666,08 665,21 664,67	1 2 3 1 2	0,12 0,09 0,12 0,09 0,09	18,70 18,70 18,74 18,72 18,74	$3p^{4}$ ^{3}P — $3d'$ $^{3}P^{\circ}$ $3p^{4}$ ^{3}P — $3d'$ $^{3}P^{\circ}$ $3p^{4}$ ^{3}P — $3d'$ $^{3}D^{\circ}$ $3p^{4}$ ^{3}P — $3d'$ $^{3}D^{\circ}$ $3p^{4}$ ^{3}P — $3d'$ $^{3}D^{\circ}$	0-1 $1-1$ $0-1$ $1-2$ $1-1$
	663,67 663,08 662,15 661,82 655,09	2 2 1 2 1	0,00 0,00 0,00 0,00 0,00 0,12	18,68 18,70 18,72 18,73 19,05	$3p^{4} ^{3}P - 3d' ^{3}P^{9}$ $3p^{4} ^{3}P - 3d' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 5s ^{3}S^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-2 \\ 2-3 \\ 0-1 \end{array} $
	653,80 651,13 650,88 639,42 638,23	1 1 2 2	0,09 0,00 0,00 0,09 0,12	19,05 19,04 19,05 19,47 19,55	$3p^4 \ ^3P - 5s \ ^3S^{\circ}$ $3p^4 \ ^3P - 3d' \ ^3S^{\circ}$ $3p^4 \ ^3P - 5s \ ^3S^{\circ}$ $3p^4 \ ^3P - 3p^54s \ ^3P^{\circ}$ $3p^4 \ ^3P - 3p^54s \ ^3P^{\circ}$	1-1 2-1 2-1 1-2 0-1
	637,06 636,62 635,87 634,24 626,70	1 2 2 1 1	0,09 0,00 0,09 0,00 1,44	19,55 19,47 19,58 19,55 21,23	$3p^4$ 3P — $3p^54s$ $^3P^\circ$ $3p^4$ 3P — $3p^54s$ $^3P^\circ$ $3p^4$ 3P — $3p^54s$ $^3P^\circ$ $3p^4$ 3P — $3p^54s$ $^3P^\circ$ $3p^4$ 1D — $5s'$ $^1D^\circ$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 1 - 0 \\ 2 - 1 \\ 2 - 2 \end{array} $
	621,12 620,28 618,02 617,61 617,27	4 1 2 1 0	0,12 0,09 0,00 0,00 0,00	20,08 20,07 20,06 20,07 20,08	$3p^4 \ ^3P-4d \ ^3D^{\circ}$ $3p^4 \ ^3P-4d \ ^3D^{\circ}$ $3p^4 \ ^3P-4d \ ^3D^{\circ}$ $3p^4 \ ^3P-4d \ ^3D^{\circ}$ $3p^4 \ ^3P-4d \ ^3D^{\circ}$	0-1 $1-2$ $2-3$ $2-2$ $2-1$
	612,73 599,19 594,49 589,82 588,77	0 0 0 0	1,44 1,44 1,44 0,12 0,09	21,68 22,13 22,30 21,14 21,14	$3p^{4} ^{1}D - 4d' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 4d' ^{1}D^{\circ}$ $3p^{4} ^{1}D - 4d' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 5s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 5s' ^{3}D^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 2 - 1 \\ 0 - 1 \\ 1 - 2 \end{array} $
	586,25 584,10 575,30 574,37 571,95	0 1 0 3 1	0,00 0,00 0,12 0,09 0,00	21,15 21,23 21,67 21,67 21,68	$3p^4 \ ^3P - 5s' \ ^3D^\circ$ $3p^4 \ ^3P - 5s' \ ^1D^\circ$ $3p^4 \ ^3P - 4d' \ ^3D^\circ$ $3p^4 \ ^3P - 4d' \ ^3D^\circ$ $3p^4 \ ^3P - 4d' \ ^3D^\circ$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 0-1 \\ 1-2 \\ 2-3 \end{array} $
24	0					

λ, Λ	I	$E_{ m H},~{ m eV}$	$E_{ m B},{ m eV}$	Transition	J
566,77	0	0,12	22,00	$3p^{4} ^{3}P - 4d' ^{3}S^{\circ}$	0—1
565,75 563,58	0	$\begin{array}{c} 0,12 \\ 0,00 \end{array}$	$\begin{array}{c} 22,04 \\ 22,00 \end{array}$	$3p^4 \ ^3P - 4d' \ ^3P^\circ \ 3p^4 \ ^3P - 4d' \ ^3S^\circ$	0—1 2—1
562,54 562,28	$\frac{0}{3}$	$00,00 \\ 00,0$	$\begin{array}{c} 22,04 \\ 22,05 \end{array}$	$3p^4 \ ^3P - 4d' \ ^3P^{\circ} \ 3p^4 \ ^3P - 4d' \ ^3P^{\circ}$	$\begin{array}{c} 2-1 \\ 2-2 \end{array}$
558,14	1	0,09	$\frac{12}{22}, \frac{30}{30}$	$3p^{4} ^{3}P - 4d' ^{1}P^{\circ}$	$\frac{1}{1} - \frac{1}{1}$

Cl III, ground state $1s^2 2s^2 2p^6 3s^2 3p^{3 4}S_{3/2}^{\circ}$ Ionization potential 321936 cm⁻¹; 39,912 eV

λ, Α	I	$E_{ m H}$, eV	$E_{\mathrm{B}},\;eV$	Transition	J
4971,64 4863,75 4854,37 4808,00 4703,14	0 1 0 1 3	23,04 24,32 23,36 23,36 24,21	25,53 26,87 25,92 25,93 26,84	3d ² P-4p ² D° 3d' ² F-4p' ² F° 4s' ² D-4p ² P° 4s' ² D-4p ² P° 3d' ² D-4p' ² F°	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4695,07 4669,50 4638,96 4635,83 4613,78	1 0 2 0 2	22,29 22,27 22,29 24,17 22,27	24,93 24,93 24,96 26,84 24,96	$3d\ ^4P-4p\ ^4D^{\circ}\ 3d\ ^4P-4p\ ^4D^{\circ}\ 3d\ ^4P-4p\ ^4D^{\circ}\ 3d'\ ^2D-4p'\ ^2F^{\circ}\ 3d\ ^4P-4p\ ^4D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
4608,21 4604,43 4596,22 4591,10 4523,33	5 0 4 4 4	24,32 24,32 24,17 24,32 22,27	27,01 27,01 26,87 27,02 25,01	3d' ² F-4p' ² D° 3d' ² F-4p' ² D° 3d' ² D-4p' ² F° 3d' ² F-4p' ² D° 3d ⁴ P-4p ⁴ D°	7/2 - 5/2 $ 5/2 - 5/2 $ $ 5/2 - 7/2 $ $ 5/2 - 3/2 $ $ 3/2 - 5/2$
4489,17 4414,90 4380,57 4370,91 4369,60	$egin{array}{c} 1 \\ 2 \\ 2 \\ 4 \\ 2 \end{array}$	22,25 24,21 23,09 22,25 24,67	25,01 27,02 25,92 25,09 27,51	$3d^{4}P-4p^{4}D^{\circ}$ $3d'^{2}D-4p'^{2}D^{\circ}$ $3d^{2}P-4p^{2}P^{\circ}$ $3d^{4}P-4p^{4}D^{\circ}$ $3d'^{2}P-4p'^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
4364,79 4354,03 4353,73 4341,47 4324,66	3 2 2 2 2	22,69 22,57 23,09 24,65 24,67	25,53 25,42 25,93 27,51 27,54	$3d^{2}D-4p^{2}D^{\circ} \ 3d^{2}D-4p^{2}D^{\circ} \ 3d^{2}P-4p^{2}P^{\circ} \ 3d'^{2}P-4p'^{2}P^{\circ} \ 3d'^{2}P-4p'^{2}P^{\circ} \ 3d'^{2}P-4p'^{2}P^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
4308,42 4297,04 4282,46 4124,00 4106,83	1 0 4 1 5	23,04 24,65 23,04 22,29 22,29	25,92 27,54 25,93 25,29 25,31	$3d^{2}P-4p^{2}P^{\circ}$ $3d'^{2}P-4p'^{2}P^{\circ}$ $3d^{2}P-4p^{2}P^{\circ}$ $3d^{4}P-4p^{4}P^{\circ}$ $3d^{4}P-4p^{4}P^{\circ}$	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
4104,23 4087,00 4059,07 4018,50 3991,50	5 4 6 6 7	22,27 22,27 22,25 22,27 22,25	25,29 25,31 25,31 25,36 25,36	$3d ^4P - 4p ^4P^{\circ}$ $3d ^4P - 4p ^4P^{\circ}$ $3d ^4P - 4p ^4P^{\circ}$ $3d ^4P - 4p ^4P^{\circ}$ $3d ^4P - 4p ^4P^{\circ}$	3/2 - 1/2 $3/2 - 3/2$ $5/2 - 3/2$ $3/2 - 5/2$ $5/2 - 5/2$
3958,39 3925,87 3881,73 3850,81 3824,47	0 5 3 4 4	22,29 22,20 22,11 22,20 22,69	25,42 25,36 25,31 25,42 25,93	$3d\ ^4P-4p\ ^2D^\circ$ $4s\ ^2P-4p\ ^4P^\circ$ $4s\ ^2P-4p\ ^4P^\circ$ $4s\ ^2P-4p\ ^2D^\circ$ $3d\ ^2D-4p\ ^2P^\circ$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3822,02 3804,83 3803,57	4 3 3	22,29 22,27 22,27	25,53 25,53 25,53	$3d\ ^4P-4p\ ^4S^{\circ} \ 3d\ ^4P-4p\ ^4S^{\circ} \ 3d\ ^4P-4p\ ^2D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $ 319

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λ, Α	I	E_{H} , eV	E _B . eV	Transition	J
3779,35	5	22,25	25,53	$3d^{4}P - 4p^{2}D^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3764,42	2	27,54	30,83	$4p'^{2}P^{\circ} - 4d^{2}D$	
3759,10 3748,81 3741,70 3725,74 3725,46	3 8 3 3 1	24,21 22,11 21,65 24,21 27,01	27,51 25,42 24,96 27,54 30,34	$3d'\ ^{2}D-4p'\ ^{2}P^{\circ}$ $4s\ ^{2}P-4p\ ^{2}D^{\circ}$ $4s\ ^{4}P-4p\ ^{4}D^{\circ}$ $3d'\ ^{2}D-4p'\ ^{2}P^{\circ}$ $4p'\ ^{2}D^{\circ}-4d\ ^{2}F$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
3720 ,45	8	22,20	25,53	$4s^{2}P-4p^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3707 ,34	6	22,57	25,92	$3d^{2}D-4p^{2}P^{\circ}$	
3705 ,45	6	21,58	24,93	$4s^{4}P-4p^{4}D^{\circ}$	
3688 ,10	2	22,57	25,93	$3d^{2}D-4p^{2}P^{\circ}$	
3683 ,39	5	24,17	27,54	$3d'^{2}D-4p'^{2}P^{\circ}$	
3682,05	7	21,65	25,01	$4s ^4P - 4p ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
3670,28	7	21,58	24,96	$4s ^4P - 4p ^4D^{\circ}$	
3661,48	1	26,84	30,23	$4p' ^2F^{\circ} - 4d ^2F$	
3656,95	7	21,54	24,93	$4s ^4P - 4p ^4D^{\circ}$	
3622,69	7	21,54	24,96	$4s ^4P - 4p ^4D^{\circ}$	
3612,85	8	21,58	25,01	$4s ^4P - 4p ^4D^{\circ}$	$ \begin{array}{c} 3/2 - \frac{5}{2} \\ 5/2 - \frac{7}{2} \\ 7/2 - \frac{7}{2} \\ 3/2 - \frac{5}{2} \\ 5/2 - \frac{5}{2} \end{array} $
3602,10	9	21,65	25,09	$4s ^4P - 4p ^4D^{\circ}$	
3573,69	2	26,87	30,34	$4p' ^2F^{\circ} - 4d' ^2F$	
3560,68	8	23,36	26,84	$4s' ^2D - 4p' ^2F^{\circ}$	
3553,35	1	23,36	26,84	$4s' ^2D - 4p' ^2F^{\circ}$	
3530,03	9	23,36	26,87	$4s' {}^{2}D - 4p' {}^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3400,15	2	23,36	27,01	$4s' {}^{2}D - 4p' {}^{2}D^{\circ}$	
3393,45	8	23,36	27,01	$4s' {}^{2}D - 4p' {}^{2}D^{\circ}$	
3392,89	8	23,36	27,02	$4s' {}^{2}D - 4p' {}^{2}D^{\circ}$	
3387,60	6	21,65	25,31	$4s' {}^{4}P - 4p {}^{4}P^{\circ}$	
3386,22 3340,42 3336,16 3329,06 3320,57	5 9 5 8 7	23,36 21,65 21,58 22,30 21,58 22,20	27,02 25,36 25,29 25,92 25,31 25,93	$1s' \ ^{2}D - 4p' \ ^{2}D^{\circ}$ $4s \ ^{4}P - 4p \ ^{4}P^{\circ}$ $4s \ ^{4}P - 4p \ ^{4}P^{\circ}$ $4s \ ^{2}P - 4p \ ^{2}P^{\circ}$ $4s \ ^{4}P - 4p \ ^{4}P^{\circ}$ $4s \ ^{2}P - 4p \ ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3300,95 3289,80 3283,41 3265,45 3259,32	3 7 6 0 6	21,54 21,54 21,58 27,02 22,11	25,29 25,31 25,36 30,81 25,92	$4s^{4}P - 4p^{4}P^{\circ}$ $4s^{4}P - 4p^{4}P^{\circ}$ $4s^{4}P - 4p^{4}P^{\circ}$ $4s^{4}P - 4p^{4}P^{\circ}$ $4p'^{2}D^{\circ} - 4d^{2}D$ $4s^{2}P - 4p^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
3245,05 3244,44 3230,78 3193,84 3191,45	2 5 1 0 9	27,01 22,11 21,58 21,54 21,65	30,83 25,93 25,42 25,42 25,53	$4p' \ ^2D^{\circ} - 4d \ ^2D$ $4s \ ^2P - 4p \ ^2P^{\circ}$ $4s \ ^4P - 4p \ ^2D^{\circ}$ $4s \ ^4P - 4p \ ^2D^{\circ}$ $4s \ ^4P - 4p \ ^4S^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3190 ,58	4	21,65	25,53	$4s ^4P - 4p ^2D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
3139 ,34	8	21,58	25,53	$4s ^4P - 4p ^4S^{\circ}$	
3123 ,74	1	26,84	30,81	$4p ^2F^{\circ} - 4d ^2D$	
3104 ,46	6	21,54	25,53	$4s ^4P - 4p ^4S^{\circ}$	
2991 ,82	3	23,36	27,51	$4s' ^2D - 4p' ^2P^{\circ}$	
2970 ,67	4	23,36	27,54	4s' 2D—4p' 2P°	3/2 - 3/2 $5/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
2965 ,56	6	23,36	27,54	4s' 2D—4p' 2P°	
2949 ,1	1	25,93	30,14	4p 2P°—4d 4P	
2805 ,17	2	25,53	29,95	4p 4S°—4d 4D	
2796 ,37	1	25,53	29,96	4p 4S°—4d 4D	
2769,3	3	25,53	30,01	4p ² D°—4d ⁴ D	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array}$
2727,7	2	25,42	29,96	4p ² D°—4d ⁴ D	
2724,03	5	27,02	31,57	4p' ² D°—4d' ² D	
2717,62	2	27,54	32,10	4p' ² P°—5s' ² D	
2714,37	2	27,01	31,57	4p' ² D°—4d' ² D	

λ, Α	I	E _H , eV	EB, eV	Transition	J
2710,37	7	25,53	30,10	4p 4S°-4d 4P	3/2-5/2
2699,79	1	$\left\{\begin{array}{c} 27,51\\25,36 \end{array}\right.$	32,10 29,95	$4p^{'} \ ^{2}P^{\circ} - 5s' \ ^{2}P \ 4p \ ^{4}P^{\circ} - 4d \ ^{4}D$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
2691,52	5	$\begin{cases} 25,53\\ 25,36 \end{cases}$	30,14 29,96	$4p$ $4S^{\circ}$ — $4d$ $4P$ $4p$ $4P$ $4D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2685,40	4	27,02	31,63	$4p' \ ^{2}D^{\circ}-4d' \ ^{2}F$	$^{3}/_{2}$ — $^{5}/_{2}$
2684,76 $2682,40$	5 3	27,01 25,53	31,62 30,15	$4p'$ $^2D^\circ$ — $4d'$ 2F $4p$ $^4S^\circ$ — $4d$ 4P	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
2680,88	$\begin{array}{c} 3 \\ 2 \\ 2 \end{array}$	27,01	31,63	$4p' \ ^2D^{\circ} - 4d' \ ^2F \ 4p \ ^4D^{\circ} - 4d \ ^4F$	$^{5}/_{2}^{-}$ $^{5}/_{2}^{-}$
2675,4 2669,52	3	25,09 $25,31$	29,72 29,95	$4p ^4P^{\circ} - 4d ^4D$	$\frac{7}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$
2665,54 $2663,20$	$\frac{6}{3}$	25,36 $25,29$	30,01 29,95	4p $4P$ °— $4d$ $4D4p$ $4P$ °— $4d$ $4D$	$\frac{5}{2}$ — $\frac{7}{2}$ $\frac{1}{2}$ — $\frac{1}{2}$
2662 ,29 2661 ,65	3 5	25,29 $25,31$	29,95 29,96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1/2}{2}$ $\frac{3/2}{3/2}$ $\frac{3}{2}$ $\frac{5}{2}$
2651,19	3	25,09	29,76	$4D^{\circ}-4d^{4}F$	7/2 - 7/2 $7/2 - 7/2$ $5/2 - 5/2$
2633 ,18 2632 ,67	5 5	$25,01 \\ 26,87$	29 ,72 31 ,57	$\stackrel{4}{4p}$ $^4D^{\circ}$ — 4d 4F $^4p'$ $^2F^{\circ}$ — $^4d'$ 2D	⁷ / ₂ — ⁵ / ₂
2624,71 2620,05	3	26,84 26,84	31,57 31,57	$^{4p'}_{p'}^{2}F^{\circ}$ — $^{4d'}_{2}D$ $^{4p'}_{p'}^{2}F^{\circ}$ — $^{4d'}_{2}D$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2618 ,78	4 4	24,96	29,69	$\stackrel{4p}{4} \stackrel{4D}{}^{\circ} - \stackrel{4d}{4} \stackrel{4F}{}^{\circ}$ $\stackrel{4p}{4} \stackrel{4D}{}^{\circ} - \stackrel{4d}{4} \stackrel{4F}{}^{\circ}$	$\frac{3/2}{7/2}$ $\frac{3/2}{9/2}$
.2616 ,97 2611 ,45	2	$25,09 \ 25,36$	29 ,82 30 ,10	4p 4P°—4d 4P	$\frac{7_2 - 7_2}{5_2 - 5_2}$
2609,50 2605,04	$rac{4}{2}$	$25,01 \\ 26,87$	29,76 31,62	$^{4p}_{p}^{4}D^{\circ}-4d^{4}F$ $^{4p'}_{p}^{2}F^{\circ}-4d'^{2}F$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
2603,59 2601,16	5 4	24,96 24,93	29,72 29,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2593,97	2	25,36	30,14	4p 4P°—4d 4P	5/2-3/2
2592 ,45 2588 ,80	$\frac{2}{3}$	$26,84 \\ 26,84$	31,62 31,63	$4p' \ ^{2}F^{\circ}$ — $4d' \ ^{2}F$ $4p' \ ^{2}F^{\circ}$ — $4d' \ ^{2}F$	$\frac{5}{2}$ _2 $\frac{7}{2}$ _5 $\frac{5}{2}$ _2 $\frac{5}{2}$
2580,67 2578,26	$rac{6}{5}$	$25,53 \\ 22,20$	30,34 27,01	$\frac{4p}{4s} \frac{^2D^{\circ}-4d}{^2F} \frac{^2F}{4p'} \frac{^2D^{\circ}}{^2D^{\circ}}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2577,13	5	25,42	30,23	$4p~^2D^{\circ}$ — $4d~^2F$	$\frac{3}{2}$ $\frac{5}{2}$
2574 ,13 2566 ,23	0 1	$22,20 \\ 25,31$	27,02 30,14	4s ² P - 4p' ² D° 4p ⁴ P° - 4d ⁴ P	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2562 ,52 2559 ,50	1 3	$25,53 \\ 25,29$	30,37 $30,14$	$\frac{4p}{4p} ^{4}S^{\circ} - 5s ^{4}P$ $4p ^{4}P^{\circ} - 4d ^{4}P$	$\frac{3}{2}$ _1/2 $\frac{1}{2}$ _2 $\frac{3}{2}$
2557,9	3	25,31	30,15	$^{4p}_{4p}^{4}P^{\circ}$ — $^{4d}_{4p}^{4}P^{\circ}$ — $^{4d}_{4p}$	$\frac{3}{2}$ $\frac{-1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$
2542,65 2540,84	2 3	25,09 $25,92$	29,96 30,81	$4p^{2}P^{\circ}-4d^{2}D$	$\frac{3/2}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
$2533,95 \\ 2532,48$	1 5	$25,53 \\ 25,93$	$30,42 \\ 30,83$	$\stackrel{4p}{4p}\stackrel{4S^{\circ}}{-5s}\stackrel{4P}{4d}\stackrel{2D}{}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2531,76	5 5	$25,92 \\ 22,11$	30,81 27,02	$^{4p} ^{2}P^{\circ} - ^{4d} ^{2}D \ ^{4s} ^{2}P - ^{4p'} ^{2}D^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2528,08 2519,45	5	25,09	30,01	$4p ^4D^{\circ} - 4d ^4D$ $4p ^4D^{\circ} - 4d ^4D$	$\frac{\frac{7}{2}}{\frac{5}{2}} - \frac{\frac{7}{2}}{\frac{2}{2}}$
2510,92 2504,23	$\frac{4}{5}$	$25,01 \ 25,01$	$29,95 \\ 29,96$	$4p ^4D - 4a ^4D$ $4p ^4D ^\circ - 4d ^4D$	$\frac{5}{2} - \frac{5}{2}$
2490,3 2486,91	5 5	$25,36 \ 25,53$	$30,34 \\ 30,52$	$^{4p}_{^{4}P}^{\circ}$ $^{-4}d^{^{2}F}_{4p}^{^{4}S}^{\circ}$ $^{-5}s^{^{4}P}$	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$
2485,1	3	24,96	29,95 29,95	$4p ^4D^{\circ} - 4d ^4D$ $4p ^4D^{\circ} - 4d ^4D$	$\frac{3}{2}$ _1/2 $\frac{3}{2}$ _2-3/2
2484,27 2481,77	4 2	24 ,96 25 ,01	30,01	$4p ^4D^{\circ}$ — $4d ^4D$	⁵ / ₂ — ⁷ / ₂
2477,29 2471,07	$\frac{2}{5}$	$24,96 \\ 25,09$	$29,96 \\ 30,10$	4p $^{4}D^{\circ}$ $ ^{4d}$ ^{4}D ^{4}p $^{4}D^{\circ}$ $ ^{4d}$ ^{4}P	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2469,20	5 3	24,93 $24,93$	$29,95 \\ 29,95$	$4p$ $4D^{\circ}$ — $4d$ $4D$ $4p$ $4D^{\circ}$ — $4d$ $4D$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2468,37 $2448,58$	6	25,31	30,37	$4p 4P^{\circ} - 5s 4P$	$\frac{1/2-3/2}{3/2-1/2}$ $\frac{3}{2-1/2}$
$2447,14 \\ 2442,47$	$rac{6}{5}$	25 ,36 25 ,29	$30,42 \\ 30,37$	$4p ^4P^{\circ} - 5s ^4P \ 4p ^4P^{\circ} - 5s ^4P$	$^{5/}_{2}$ $^{3/}_{2}$ $^{1/}_{2}$ $^{1/}_{2}$
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
2439,69	5	27,02	32,10	4p' 2D°-5s' 2D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2436,1	5	27,01	32,10	4p' 2D°-5s' 2D	
2435,1	2	25,01	30,10	4p 4D°-4d 4P	
2422,47	4	25,31	30,42	4p 4P°—5s 4P	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
2419,5	5	25,01	30,14	4p 4D°—4d 4P	
2416,42	7	25,29	30,42	4p 4P°—5s 4P	
2403,32	5	25,36	30,52	4p 4P°—5s 4P	
2394,73	5	24,96	30,14	4p 4D°—4d 4P	
2387,3	3	24,96	30,15	$4p ^4D^{\circ}$ — $4d ^4P$	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array}$
2379,47	5	25,31	30,52	$4p ^4P^{\circ}$ — $5s ^4P$	
2372,7	0	24,93	30,15	$4p ^4D^{\circ}$ — $4d ^4P$	
2370,37	6	26,87	32,10	$4p' ^2F^{\circ}$ — $5s' ^2D$	
2359,67	6	26,84	32,10	$4p' ^2F^{\circ}$ — $5s' ^2D$	
2347,7 2340,64 2336,45 2323,50 2298,51	2 6 5 6 5	$25,53 \\ 25,53 \\ 22,20 \\ 22,20 \\ 22,11 \\ 25,42$	30,81 30,83 27,51 27,54 27,51 30,81	$4p\ ^2D^{\circ}$ — $4d\ ^2D$ $4p\ ^2D^{\circ}$ — $4d\ ^2D$ $4s\ ^2P$ — $4p'\ ^2P^{\circ}$ $4s\ ^2P$ — $4p'\ ^2P^{\circ}$ $4s\ ^2P$ — $4p'\ ^2P^{\circ}$ $4p\ ^2D^{\circ}$ — $4d\ ^2D$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
2291,81 2291,38 2286,0 2283,93 2278,34	4 4 3 7 5	{ 25,42 24,96 25,01 22,11 25,09 24,93	30,83 30,37 30,42 27,54 30,52 30,37	$4p^{2}D^{\circ}-4d^{2}D$ $4p^{4}D^{\circ}-5s^{4}P$ $4p^{4}D^{\circ}-5s^{4}P$ $4s^{2}P-4p'^{2}P^{\bullet}$ $4p^{4}D^{\circ}-5s^{4}P$ $4p^{4}D^{\circ}-5s^{4}P$ $4p^{4}D^{\circ}-5s^{4}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
2272,8	1	25,36	30,81	$4p ^4P^{\circ} - 4d ^2D$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2268,95	5	24,96	30,42	$4p ^4D^{\circ} - 5s ^4P$	
2266,08	2	25,36	30,83	$4p ^4P^{\circ} - 4d ^2D$	
2255,64	2	24,93	30,42	$4p ^4D^{\circ} - 5s ^4P$	
2253,07	7	25,01	30,52	$4p ^4D^{\circ} - 5s ^4P$	
2231 ,16 2034 ,88 2032 ,14 2024 ,21 2021 ,46	3 3 3 3	24,96 18,84 18,83 18,84 18,83	30,52 24,93 24,93 24,96 24,96	4p 4D°—5s 4P 3d 4D—4p 4D° 3d 4D—4p 4D° 3d 4D—4p 4D° 3d 4D—4p 4D°	3/2 - 5/2 $1/2 - 1/2$ $3/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$
2020,19	3	18,83	24,96	$3d ^4D - 4p ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
2011,34	1	25,93	32,10	$4p ^2P^{\circ} - 5s' ^2D$	
2006,84	4	18,84	25,01	$3d ^4D - 4p ^4D^{\circ}$	
2003,97	0	18,83	25,01	$3d ^4D - 4p ^4D^{\circ}$	
2002,72	3	18,83	25,01	$3d ^4D - 4p ^4D^{\circ}$	
1983,61	5	18,84	25,09	3d ⁴ D-4p ⁴ D°	$ \begin{array}{c} 7/2 - 7/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
1979,46	3	18,83	25,09	3d ⁴ D-4p ⁴ D°	
1920,32	4	18,84	25,29	3d ⁴ D-4p ⁴ P°	
1917,87	4	18,83	25,29	3d ⁴ D-4p ⁴ P°	
1916,53	4	18,84	25,31	3d ⁴ D-4p ⁴ P°	
1914,09	3	18,83	25,31	3d ⁴ D-4p ⁴ P°	3/2 - 3/2 $5/2 - 3/2$ $7/2 - 5/2$ $5/2 - 5/2$ $5/2 - 5/2$
1912,90	4	18,83	25,31	3d ⁴ D-4p ⁴ P°	
1901,61	5	18,84	25,36	3d ⁴ D-4p ⁴ P°	
1897,85	3	18,83	25,36	3d ⁴ D-4p ⁴ P°	
1889,06	0	25,53	32,10	4p ² D°-5s′ ² D	
1880,10 1852,11 1849,64 1848,74 1833,31	$\begin{array}{c} 3 \\ 2 \\ 0 \\ 0 \\ 4 \end{array}$	18,83 18,84 18,83 18,83 18,17	25,42 25,53 25,53 25,53 24,93	3d ⁴ D-4p ² D° 3d ⁴ D-4p ⁴ S° 3d ⁴ D-4p ⁴ S° 3d ⁴ D-4p ⁴ S° 3d ⁴ F-4p ⁴ D°	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
1832,08 1828,40 1824,59	4 5 3	18,19 18,23 18,17	24,96 25,01 24,96	$3d\ ^4F-4p\ ^4D^{\circ}\ 3d\ ^4F-4p\ ^4D^{\circ}\ 3d\ ^4F-4p\ ^4D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $

λ, Å	I	$E_{_{ m H}}^{},\;{ m eV}$	$E_{_{f B}},\ {f eV}$	Transition	J
1822,50 1817,73	6_4	18,29 18,19	25,09 25,01	$\frac{3d}{3}\frac{4F}{4F} - \frac{4p}{4}\frac{4D}{4D}^{\circ}$	$\frac{9}{2}$ $\frac{-7}{2}$ $\frac{5}{2}$ $\frac{-5}{2}$
1810,26	1	18,17	25,01	$3d {}^{4}F - 4p {}^{4}D^{\circ}$	3/2— $5/2$ $7/2$ — $7/2$ $5/2$ — $7/2$ $5/2$ — $3/2$ $3/2$ — $3/2$
1808,51	4	18,23	25,09	$3d {}^{4}F - 4p {}^{4}D^{\circ}$	
1797,98	2	18,19	25,09	$3d {}^{4}F - 4p {}^{4}D^{\circ}$	
1689,50	1	18,19	25,53	$3d {}^{4}F - 4p {}^{4}S^{\circ}$	
1683,18	0	18,17	25,53	$3d {}^{4}F - 4p {}^{4}S^{\circ}$	
1015,023 1008,777 1005,280 953,40 948,72	7 6 5 2 1	$0,00 \\ 0,00 \\ 0,00 \\ 12,29 \\ 12,29$	12,21 12,29 12,33 25,29 25,36	$3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{4} {}^{4}P - 4p {}^{4}P^{\circ}$ $3p^{4} {}^{4}P - 4p {}^{4}P^{\circ}$	3/2 - 5/2 $3/2 - 3/2$ $3/2 - 1/2$ $3/2 - 1/2$ $3/2 - 5/2$
946,97	1	12,21	25,31	$3p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P}^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
943,22	1	12,21	25,36	$3p^{4} \stackrel{4}{P} - 4p \stackrel{4}{P}^{\circ}$	
939,31	0	12,33	25,53	$3p^{4} \stackrel{4}{P} - 4p \stackrel{4}{S}^{\circ}$	
936,28	1	12,29	25,53	$3p^{4} \stackrel{4}{P} - 4p \stackrel{4}{S}^{\circ}$	
930,94	1	12,21	25,53	$3p^{4} \stackrel{4}{P} - 4p \stackrel{4}{S}^{\circ}$	
747,553	1	2,25	18,83	$3p^{3} {}^{2}D^{\circ} - 3d {}^{4}D$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array}$
747,415	1	2,24	18,83	$3p^{3} {}^{2}D^{\circ} - 3d {}^{4}D$	
746,864	1	2,24	18,84	$3p^{3} {}^{2}D^{\circ} - 3d {}^{4}D$	
673,598	1	3,71	22,11	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	
673,127	3	3,70	22,11	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	
670,383	3	3,71	22,20	$3p^{3} {}^{2}P^{\circ}$ — $4s {}^{2}P$	3/2 - 3/2 $1/2 - 3/2$ $3/2 - 3/2$ $1/2 - 3/2$ $3/2 - 5/2$
669,949	2	3,70	22,20	$3p^{3} {}^{2}P^{\circ}$ — $4s {}^{2}P$	
657,320	2	3,71	22,57	$3p^{3} {}^{2}P^{\circ}$ — $3d {}^{2}D$	
656,772	2	3,70	22,57	$3p^{3} {}^{2}P^{\circ}$ — $3d {}^{2}D$	
653,013	2	3,70	22,69	$3p^{3} {}^{2}P^{\circ}$ — $3d {}^{2}D$	
641,304 640,928 639,757 631,006 630,746	1 1 1 1	3,71 3,70 3,71 3,71 3,71	23,04 23,04 23,09 23,36 23,36	$3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$	3/2 - 3/2 $1/2 - 3/2$ $3/2 - 1/2$ $3/2 - 5/2$ $3/2 - 3/2$
630,380	1	3,70	23,36	$3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
623,768	3	2,24	22,11	$3p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	
621,280	4	2,25	22,20	$3p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	
621,027	3	2,24	22,20	$3p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	
619,025	1	2,25	22,27	$3p^{3} {}^{2}D^{\circ} - 3d {}^{4}P$	
609,901	0	2,25	22,57	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
609,673	4	2,24	22,57	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$	
606,345	5	2,25	22,69	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$	
606,100	2	2,24	22,69	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}D$	
605,855	1	3,71	24,17	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	
596,240	4	2,25	23,04	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
595,990	3	2,24	23,04	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	
594,636	4	2,24	23,09	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	
591,962	2	3,71	24,65	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	
591,646	4	3,70	24,65	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	
591,428	4	3,71	24,67	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2}, \begin{array}{c} 5/_{2} - 3/_{2}, \\ 5/_{2} - 3/_{2}, \end{array} 5/_{2} \\ 3/_{2} - 3/_{2} \end{array}$
591,118	3	3,70	24,67	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	
587,295	4	2,25	23,36	$3p^{3} {}^{2}D^{\circ} - 4s' {}^{2}D$	
587,078	3	2,24	23,36	$3p^{3} {}^{2}D^{\circ} - 4s' {}^{2}D$	
586,874	4	2,24	23,36	$3p^{3} {}^{2}D^{\circ} - 4s' {}^{2}D$	
575,582	3	0,00	21,54	$3p^{3} 4S^{\circ} - 4s^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
574,408	3	0,00	21,58	$3p^{3} 4S^{\circ} - 4s^{4}P$	
572,693	4	0,00	21,65	$3p^{3} 4S^{\circ} - 4s^{4}P$	
565,480	4	2,25	24,17	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$	
565,272	3	2,24	24,17	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$	

λ, Å	I	E _H , eV	E _B , eV	Transition	J
564,514 564,287 561,738 561,680 561,530	2 4 7 7 7	2,25 2,24 2,25 2,25 2,25 2,24	24,21 24,21 24,32 24,32 24,32	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}F$ $3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}F$ $3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}F$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
560,636 558,385 557,118 556,605 556,232	1 1 7 7 6	0,00 0,00 0,00 0,00 0,00	22,11 22,20 22,25 22,27 22,29	$3p^{3} {}^{4}S^{\circ} - 4s {}^{2}P$ $3p^{3} {}^{4}S^{\circ} - 4s {}^{2}P$ $3p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3d {}^{4}P$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 1/2$
552,908 457,444 457,245 457,169 442,947	$\begin{array}{c} 2 \\ 0 \\ 2 \\ 3 \\ 2 \end{array}$	2,25 3,71 3,70 3,71 2,24	24,67 30,81 30,81 30,83 30,23	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 4d {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 4d {}^{2}F$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
441,398 433,774 433,664 422,713 421,990	3 0 0 1 3	2,25 2,25 2,24 2,24 2,25	30,34 30,83 30,83 31,57 31,62	$3p^{3} {}^{2}D^{\circ}-4d {}^{2}F$ $3p^{3} {}^{2}D^{\circ}-4d {}^{2}D$ $3p^{3} {}^{2}D^{\circ}-4d {}^{2}D$ $3p^{3} {}^{2}D^{\circ}-4d' {}^{2}D$ $3p^{3} {}^{2}D^{\circ}-4d' {}^{2}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2, 5/2 - 3/2, 5/2 \\ 5/2 - 7/2 \end{array} $
421,771 415,333 415,196 411,812 411,373	3 1 1 4 4	2,24 2,25 2,24 0,00 0,00	31,63 32,10 32,10 30,10 30,14	$3p^{3} {}^{2}D^{\circ} - 4d' {}^{2}F$ $3p^{3} {}^{2}D^{\circ} - 5s' {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 5s' {}^{2}D$ $3p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
411 ,163 407 ,513 406 ,274	3 0 1	0,00 0,00 0,00	$30,15 \\ 30,42 \\ 30,52$	$3p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 5s {}^{4}P$	$\frac{3}{2}$ $\frac{-1}{2}$ $\frac{3}{2}$ $\frac{-3}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$

C1 IV, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^2 \, ^3P_0$ Ionization potential 431226 cm⁻¹; 53,462 eV

λ, Å	I	$E_{ m H},~{ m eV}$	E_{B} , eV	Transition	J
3167,87	2	26,84	30,75	4s ³ P°—4p ³ D	2—2
3106,09	1	26,70	30,69	$4s ^{3}P^{\circ} - 4p ^{3}D$	1—1
3076,68	6	26,84	30,87	$4s ^3P^{\circ} - 4p ^3D$	2—3
3071,36	3	26,66	30,69	$4s {}^{3}P^{\circ} - 4p {}^{3}D$	0—1
3063,13	5	26,70	30,75	$4s ^3P^{\circ} - 4p ^3D$	1-2
2835,4	4	26,84	31,21	$4s ^3P^{\circ} - 4p ^3P$	2—1
2782,47	7	26,84	31,29	$4s ^3P^{\circ} - 4p ^3P$	2-2
2770,64	4	26,70	31,18	$4s {}^{3}P^{\circ} - 4p {}^{3}P$	$\bar{1}$ — $\bar{0}$
2751 ,23	5	26,70	31,21	$4s {}^{3}P^{\circ} - 4p {}^{3}P$	1-1
2724,03	5	26,66	31,21	$4s {}^{3}P^{\circ} - 4p {}^{3}P$	0-1
2701,36	4	26,70	31,29	4s ³ P°-4p ³ P	1-2
1651,21	1	23,18	30,69	$3d ^3D^{\circ} - 4p ^3D$	1—1
1648,04	0	23,23	30,75	$3d ^3D^{\circ} - 4p ^3D$	3-2
1643,40	1	23,21	30,75	$3d ^3D^{\circ} - 4p ^3D$	$2-\bar{2}$
1638,95	0	23,18	30,75	$3d \ ^3D^{\circ}$ — $4p \ ^3D$	$\bar{1}$ — $\bar{2}$
1622,86	2	23,23	30,87	$3d ^3D^{\circ} - 4p ^3D$	3-3
1617,43	1	31,29	38,96	$4p^{3}P - 5s^{3}P^{\circ}$	$\overset{\circ}{2}$ — $\overset{\circ}{2}$
1551,27	1	23,18	31,18	$3d^{3}D^{\circ}-4p^{3}P$	1-0
1549,15	2	23,21	31,21	$3d ^{3}D^{\circ} - 4p ^{3}P$	2—1
1545,19	$\overline{2}$	23,18	31,21	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	11
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λ, Δ	I	$E_{ m H}^{}$, eV	E_{B} , eV	Transition	J
1539,30 1537,21 1533,25 1532,19 1529,28	2 3 1 1 0	30,75 23,23 23,21 30,87 23,18	38,80 31,29 31,29 38,96 31,29	$4p \ ^{3}D - 5s \ ^{3}P^{\circ}$ $3d \ ^{3}D^{\circ} - 4p \ ^{3}P$ $3d \ ^{3}D^{\circ} - 4p \ ^{3}P$ $4p \ ^{3}D - 5s \ ^{3}P^{\circ}$ $3d \ ^{3}D^{\circ} - 4p \ ^{3}P$	$ \begin{array}{c} 2-1 \\ 3-2 \\ 2-2 \\ 3-2 \\ 1-2 \end{array} $
1440,95 1426,89 1421,97 1413,39 985,749	0 1 1 1 4	22,60 22,52 22,57 22,52 0,16	31,18 31,21 31,29 31,29 12,74	$3d\ ^{3}P^{\circ}-4p\ ^{3}P$ $3d\ ^{3}P^{\circ}-4p\ ^{3}P$ $3d\ ^{3}P^{\circ}-4p\ ^{3}P$ $3d\ ^{3}P-4p\ ^{3}P$ $3p^{2}\ ^{3}P-3p^{3}\ ^{3}D^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 1 - 2 \\ 2 - 2 \\ 2 - 2 \end{array} $
984,952 977,901 977,560 973,212 840,933	7 4 6 5 4	0,16 0,06 0,06 0,00 0,16	12,75 12,74 12,74 12,74 14,91	$3p^2 ^3P - 3p^3 ^3D^\circ$ $3p^2 ^3P - 3p^3 ^3D^\circ$ $3p^2 ^3P - 3p^3 ^3D^\circ$ $3p^2 ^3P - 3p^3 ^3D^\circ$ $3p^2 ^3P - 3p^3 ^3P^\circ$	$ \begin{array}{c} 2-3 \\ 1-1 \\ 1-2 \\ 0-1 \\ 2-2 \end{array} $
840,808 834,967 834,840 834,659 831,431	6 5 3 4	0,16 0,06 0,06 0,06 0,00	14,91 14,91 14,91 14,91 14,91	$3p^2 \ ^3P - 3p^3 \ ^3P^\circ$ $3p^2 \ ^3P - 3p^3 \ ^3P^\circ$	2-1 1-2 1-1 1-0 0-1
776,91 756,563 745,205 684,490 672,428	0 1 4 0 0	14,91 4,04 4,04 12,74 12,74	30,87 20,42 20,67 30,87 31,18	$3p^3 3P^{\circ} - 4p 3D$ $3p^2 1S - 3p^3 3S^{\circ}$ $3p^2 1S - 3p^3 1P^{\circ}$ $3p^3 3D^{\circ} - 4p 3D$ $3p^3 3D^{\circ} - 4p 3P$	2-3 0-1 0-1 3-3 1-0
668,770 662,454 653,696 612,070 608,903	2 3 4 4 4	12,75 1,71 1,71 0,16 0,06	31,29 20,42 20,67 20,42 20,42	$3p^3 ^3D^{\circ} - 4p ^3P$ $3p^2 ^1D - 3p^3 ^3S^{\circ}$ $3p^2 ^1D - 3p^3 ^1P^{\circ}$ $3p^2 ^3P - 3p^3 ^3S^{\circ}$ $3p^2 ^3P - 3p^3 ^3S^{\circ}$	$ \begin{array}{r} 3-2 \\ 2-1 \\ 2-1 \\ 2-1 \\ 1-1 \end{array} $
607,088 604,590 601,499 599,733 554,619	3 5 2 7	0,00 0,16 0,06 0,00 0,16	20,42 20,67 20,67 20,67 22,52	$3p^2 \ ^3P - 3p^3 \ ^3S^\circ \ 3p^2 \ ^3P - 3p^3 \ ^1P^\circ \ 3p^2 \ ^3P - 3p^3 \ ^1P^\circ \ 3p^2 \ ^3P - 3d \ ^3P^\circ $	0-1 $2-1$ $1-1$ $0-1$ $2-2$
553,297 552,017 550,706 550,020 549,219	6 7 3 4 5	0,16 0,06 0,06 0,06 0,00	22,57 22,52 22,57 22,60 22,57	$3p^2 \ ^3P - 3d \ ^3P^\circ \ 3p^2 \ ^3P - 3d \ ^3P^\circ \ $	$ \begin{array}{r} 2-1 \\ 1-2 \\ 1-1 \\ 1-0 \\ 0-1 \end{array} $
538,595 538,119 537,606 536,150 535,666	4 6 9 6 7	0,16 0,16 0,16 0,06 0,06	23,18 23,21 23,23 23,18 23,21	$3p^2 \ ^3P - 3d \ ^3D^\circ$ $3p^2 \ ^3P - 3d \ ^3D^\circ$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $
535,039 534,727 486,172 467,194 466,132	4 8 8 3 3	4,04 0,00 1,71 0,16 0,06	27,21 23,18 27,21 26,70 26,66	$\begin{array}{c} 3p^2 {}^{1}S - 4s {}^{1}P^{\circ} \\ 3p^2 {}^{3}P - 3d {}^{3}D^{\circ} \\ 3p^2 {}^{1}D - 4s {}^{1}P^{\circ} \\ 3p^2 {}^{3}P - 4s {}^{3}P^{\circ} \\ 3p^2 {}^{3}P - 4s {}^{3}P^{\circ} \end{array}$	0-1 0-1 2-1 2-1 1-0
465,350 464,861 464,292 463,011 440,245	3 4 3 3 2	0,06 0,16 0,00 0,06	26,70 26,84 26,70 26,84	$3p^{2} ^{3}P - 4s ^{3}P^{\circ} \ 3p^{2} ^{3}P - 4s ^{3}P^{\circ} \ 3p^{2} ^{3}P - 4s ^{3}P^{\circ} \ 3p^{2} ^{3}P - 4s ^{3}P^{\circ} \ - $	1—1 2—2 0—1 1—2
439,255 437,825 331,835	3 4 2	_ 1,71		$3p^2 ^3P - 5s ^1P^\circ$	

λ, Å	I	E _H , eV	E _B , eV	Transition	J
320,881	1	0,16	38,80	$3p^2 ^3P - 5s ^3P^{\circ}$	2-1
320,250 319,993	0	$0,06 \\ 0,06$	38,77 38,80	$3p^2 \ ^3P - 5s \ ^3P^\circ \ 3p^2 \ ^3P - 5s \ ^3P^\circ$	1—0 1—1
319,616 319,513	3 1	$\substack{0,16\\0,00}$	38,96 38,80	$3p^3 3P - 5s 3P^\circ 3p^2 3P - 5s 3P^\circ$	$\begin{array}{c} 2-2 \\ 0-1 \end{array}$
318,750	1	0,06	38,96	$3p^2 ^3P - 5s ^3P^{\circ}$	1-2

C1 V, ground state $1s^2 2s^2 2p^6 3s^2 3p^2 P_{1/2}^0$ Ionization potential 547000 cm $^{-1}$; 67,81 eV

	poten	trai 047	ooo em	, 07,01 64	
λ, Å	I	E_{H} , eV	$E_{ m B}$, eV	Transition	J
894,910	1	0,18	14,04	3p ² P°-3p ² ² D	3/2-3/2
894,340	$\overset{1}{4}$	0,18	14,04	$3p^{-1}P^{\circ} - 3p^{2} 2D$	3/2 72
883,127	4	$0,10 \\ 0,00$	14,03	$3p^{-1} - 3p^{-1} D$ $3p^{-2}P^{\circ} - 3p^{2-2}D$	$\frac{3}{2}$ $\frac{5}{2}$ _2 $\frac{1}{2}$ $\frac{3}{2}$
688,933	4		14,04	$3p ^{2}P -3p^{2} ^{2}D$ $3p ^{2}P ^{\circ} -3p^{2} ^{2}S$	$\frac{3}{2}$ $\frac{-3}{2}$ $\frac{3}{2}$ $\frac{-1}{2}$
683,171	4	0.18	18,18	3p - P - 3p - 3 $3 - 24p - 3 - 34c^{\circ}$	5/2
		10,83	28,98	$3p^2 ^4P - 3p^3 ^4S^\circ$	⁵ / ₂ — ³ / ₂
681,924	4	0,00	18,18	$3p^{2}P^{\circ} - 3p^{2}^{2}S$	1/2-1/2
679,257	3	10,73	28,98	$3p^{2} {}^{4}P - 3p^{3} {}^{4}S^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
676,785	3	10,66	28,98	$3p^2 ^4P - 3p^3 ^4S^\circ$	$^{1}/_{2}$ — $^{3}/_{2}$
639,226	3	0,18	19,58	$3p {}^{2}P^{\circ} - 3p^{3} {}^{2}P$	$^{3}/_{2}$ — $^{1}/_{2}$
635,323	4	0,18	19,70	$3p^{2}P^{\circ}$ — $3p^{2}^{2}P$	$^{3}/_{2}$ — $^{3}/_{2}$
633,186	4	0,00	19,58	$3p^{2}P^{\circ} - 3p^{2}^{2}P$	$^{1}/_{2}$ — $^{1}/_{2}$
629,354	3	0,00	19,70	$3p^{2}P^{\circ} - 3p^{2}^{2}P$	$\frac{1}{2}$ $\frac{3}{2}$
554,210	1	_	-		/z /z
551,643	1	_	_		
551,117	$ ilde{2}$		_		
547,630	10	40 92	22 /7	$3p^2 ^4P - 3d ^4P^{\circ}$	5/ 5/
546,329	6	10,83 10,83	33,47		$\frac{5}{2} - \frac{5}{2}$
540,323 545,444			33,52	$3p^2 ^4P - 3d ^4P^\circ$	$\frac{5}{2}$ $\frac{3}{2}$
545,114	10	10,73	33,47	$3p^{2} 4P - 3d 4P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
543,818	1	10,73	33,52	$3p^{2} ^{4}P - 3d ^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$
542,868	4	10,73	33,57	$3p^2 ^4P - 3d ^4P^{\circ}$	$^{3}/_{2}$ — $^{1}/_{2}$
542,395	3	0,18	23,04	$3p ^2P$ $-3d ^2D$	3/ ₂ —3/ ₂
542,297	6	0,18	23,05	$3p^{-2}P - 3d^{-2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
542,229	8	10,66	33,52	$3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
541 ,284	3	10,66	33,57	$3p^{2} ^{4}P - 3d ^{4}P^{\circ}$	$1/2_{2}$
539,441	0	10,83	33,82	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$
538,977	3	10,83	33,84	$3p^{2} ^{4}P - 3d ^{4}D^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
538,681	$\overline{4}$	10,83	33,85	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	5/. 7/2
538,032	5	0,00	23,04	$3p ^{2}P^{\circ} - 3d ^{2}D$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
537,461	3	10,73	33,80	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	3/2 - 1/2
537,006	$\overline{4}$	10,73	33,82	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	3/2 - 3/2
536,532	3	10,73	33,84		
535,916	9	10,75	ეე ,0 4	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
535,455	9	10,00	33,80	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{1}{2} \frac{1}{2}$ $\frac{1}{2} \frac{3}{2}$
392,433	2 2 5	10,66	33,82	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	1/2-3/2
390,148	4	0,18	31,78	$3p^{2}P^{\circ}-4s^{2}S$	$\frac{3}{2}$ $-\frac{1}{2}$
		0,00	31,78	$3p^{2}P^{\circ}-4s^{2}S$	$^{1}/_{2}$ — $^{1}/_{2}$
375,103	2	10,83	43,89	$3p^{2} {}^{4}P$ —4 $s {}^{4}P^{\circ}$	⁵ / ₂ — ³ / ₂
374, 662	1	10,73	43,82	$3p^2 ^4P - 4s ^4P^{\circ}$	$\frac{3}{2}$ _1_1_2 $\frac{1}{2}$ _1_2
373,911	0	, 10,66	43,82	$3p^{2} ^{4}P - 4s ^{4}P^{\circ}$	$1/2_{-}1/2_{2}$
		10,73	43,89	$3p^2 ^4P - 4s ^4P^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$
373,776	3	10,83	44,00	$3p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$
373,165	2	10,66	43,89	$4s^2 ^4P - 4s ^4P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
372,589	2	10,73	44,00	$3p^{2} ^{4}P - 4s ^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
327, 387	$\bar{3}$	0,18	43,33	$3p^{2}P^{\circ}-4d^{2}D$	$\frac{3}{2} - \frac{3}{2}, \frac{5}{2}$
286,127	$\overset{\circ}{2}$	0,00	43,33	$3p {}^{2}P^{\circ}-4d {}^{2}D$	$\frac{3}{2} - \frac{3}{2}, \frac{3}{2}$
237,231	$\bar{2}$	0,18	52,45	$3p^{-1}$ $-4a^{-1}D$ $3p^{-2}P^{\circ}$ $-5d^{-2}D$	
236,435	$\bar{1}$	0,00	52,46 $52,44$	$3p ^{2}P^{\circ} - 5d ^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
226	-	o , o o	~ ~ ,	$o_{P} = -5a - D$	-/2/2

Cl VI, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, {}^1S_0$ Ionization potential $780000 \, \, \mathrm{cm}^{-1}; \, 96,70 \, \, \mathrm{eV}$

λ, Å	I	$E_{\mathrm{H}},\;\mathrm{eV}$	$E_{_{ m B}},~{ m eV}$	Transition	J
736 ,762 733 ,891 730 ,311 727 ,537 724 ,129	3 3 4 3 3	12,38 12,24 12,24 12,38 12,17 12,24	29,21 29,13 29,21 29,36 29,21 29,36	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$	2-1 1-0 1-1 2-2 0-1 1-2
671,37	4	0,00	18,47	$3s^{2} {}^{1}S - 3p {}^{1}P^{\circ}$	0-1
580,444	2	29,36	50,72	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	2-2
577,444	1	29,36	50,83	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	2-1
576,419	2	29,21	50,72	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	1-2
571,435	0	29,36	51,05	$3p^{2} {}^{3}P - 3d {}^{3}D^{\circ}$	2-1
571,376	1	29,13	50,83	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	0—1
570,881	0	29,21	50,93	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	1—0
570,529	2	29,36	51,09	$3p^{2} ^{3}P - 3d ^{3}D^{\circ}$	2—2
570,025	4	29,36	51,11	$3p^{2} ^{3}P - 3d ^{3}D^{\circ}$	2—3
567,479	1	29,21	51,05	$3p^{2} ^{3}P - 3d ^{3}D^{\circ}$	1—1
566,630	2	29,21	51,09	$3p^{2} ^{3}P - 3d ^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 2-2 \\ 2-3 \\ 1-1 \end{array} $
565,480	6	29,13	51,05	$3p^{2} ^{3}P - 3d ^{3}D^{\circ}$	
555,580	- 3	12,38	34,70	$3p ^{3}P^{\circ} - 3d ^{3}D$	
555,485	20	12,38	34,70	$3p ^{3}P^{\circ} - 3d ^{3}D$	
552,053	2	12,24	34,69	$3p ^{3}P^{\circ} - 3d ^{3}D$	
551,992	10	12,24	34,70	$3p ^3P^{\circ} - 3d ^3D$	$ \begin{array}{c} 1-2 \\ 0-1 \\ 3-2, 3, 4 \\ 2-2, 3 \\ 1-2 \end{array} $
550,355	5	12,17	34,69	$3p ^3P - 3d ^3D$	
399,995	8	34,70	65,69	$3d ^3D - 4f ^3F^{\circ}$	
399,957	7	34,70	65,69	$3d ^3D - 4f ^3F^{\circ}$	
399,938	5	34,69	65,69	$3d ^3D - 4f ^3F^{\circ}$	
325,161	25	12,38	50,51	$3p \ ^{3}P^{\circ}-4s \ ^{3}S$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 0-1 \\ 2-2 \\ 2-3 \end{array} $
323,936	20	12,24	50,51	$3p \ ^{3}P^{\circ}-4s \ ^{3}S$	
323,356	15	12,17	50,51	$3p \ ^{3}P^{\circ}-4s \ ^{3}S$	
243,883	3	12,38	63,21	$3p \ ^{3}P^{\circ}-4d \ ^{3}D$	
243,854	12	12,38	63,22	$3p \ ^{3}P^{\circ}-4d \ ^{3}D$	
243,208	2	12,24	63,21	$3p ^3P^{\circ}-4d ^3D$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 2 - 3 \\ 1 - 2 \end{array} $
243,194	8	12,24	63,21	$3p ^3P^{\circ}-4d ^3D$	
242,885	5	12,17	63,21	$3p ^3P^{\circ}-4d ^3D$	
195,227	3	12,38	75,88	$3p ^3P^{\circ}-5d ^3D$	
194,796	2	12,24	75,88	$3p ^3P^{\circ}-5d ^3D$	

Ar I, ground state $1s^2 2s^2 2p^6 3s^2 3p^{6\,1}S_0$ Ionization potential 127109,9 cm⁻¹; 15,759 eV

			100,0 01		
λ, Å	I	$E_{ m II},~{ m eV}$	E _B , eV	Transition	J
25660,9 25504,4 25125,08 23966,68 23845,13	65 35 23 30 56	14,25 14,09 14,01 13,33 13,98	14,74 14,58 14,51 13,84 14,50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 1-0 3-2 1-0 4-3
23133,22 22113,2 22077,20 22039,57 21534,16	35 10 53 9 58	13,33 13,90 13,30 13,28 13,33	13,86 14,46 13,86 13,84 13,90	$\begin{array}{c} 4p' \left[\frac{1}{2} \right] - 3d \left[\frac{1}{2} \right]^{\circ} \\ 3d \left[\frac{1^{1}}{2} \right]^{\circ} - 5p \left[\frac{1}{2} \right] \\ 4p' \left[\frac{1^{1}}{2} \right] - 3d \left[\frac{1}{2} \right]^{\circ} \\ 4p' \left[\frac{1^{1}}{2} \right] - 3d \left[\frac{1}{2} \right]^{\circ} \\ 4p' \left[\frac{1^{1}}{2} \right] - 3d \left[\frac{1^{1}}{2} \right]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 2 - 1 \\ 1 - 0 \\ 1 - 2 \end{array} $
21333,27 20986,10 20811,14 20733,35 20647,17	15 155 22 11 16	13,28 13,27 13,90 14,30 13,86	13,86 13,86 14,50 14,90 14,46	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}_{2}]^{\circ} - 5p \ [2^{1}_{2}] \\ 3d' \ [1^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] \end{array}$	1—1 0—1 2—3 1—1 1—1
20616,21 20568,5 20316,82 20069,6 20025,90	356 8 23 7 7	13,30 13,90 13,48 14,06 13,84	13,90 14,51 14,09 14,66 14,46	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}/_{2}]^{\circ} - 5p \ [2^{1}/_{2}] \\ 4p' \ [^{1}/_{2}] - 5p \ [1^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 5p' \ [1^{1}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] \end{array}$	$egin{array}{c} 1-2 \\ 2-2 \\ 0-1 \\ 2-1 \\ 0-1 \\ \end{array}$
19965,75 19944,8 19817,54 18632,17 18570,53	37 7 75 13 8	13,28 13,90 13,90 13,86 14,23	13,90 14,52 14,53 14,53 14,90	$4p' [1^{1}/_{2}] - 3d [1^{1}/_{2}]^{\circ}$ $3d [1^{1}/_{2}]^{\circ} - 5p [1^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ} - 5p [1^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ} - 5p [1^{1}/_{2}]$ $3d' [1^{1}/_{2}]^{\circ} - 4f [1^{1}/_{2}]$	1-2 2-1 2-2 1-2 2-2, 1
18564,74 18429,27 18427,68 18417,91 17914,43	8 40 26 27 10	14,24 14,23 13,48 14,24	14,90 14,91 14,15 14,91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 2-3, 2 0-1 3-4, 3
17887,35 17823,90 17444,93 16940,39 16739,94	15 61 128 100 5	14,21 14,21 { 13,30 13,15 13,17 13,33	14,91 14,91 14,01 13,86 13,90 14,07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3, 2 2—3 2—3 1—1 2—2
16549 ,81 16520 ,14 16436 ,92 16122 ,97 15989 ,34	6 9 18 27 20	14,15 13,15 14,15 13,09 13,48	14,90 13,90 14,91 13,86 14,25	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—1, 2 1—2 1—2 2—1 0—1
15899,93 15883,21 15816,64 15402,58 15353,51	20 50 16 10 2	14,30 13,28 13,90 14,10 13,28	15,08 14,06 14,69 14,90 14,09	$\begin{array}{c} 3d' \left[1^{1}/_{2} \right]^{\circ} - 4f' \left[2^{1}/_{2} \right] \\ 4p' \left[1^{1}/_{2} \right] - 3d \left[2^{1}/_{2} \right]^{\circ} \\ 3d \left[1^{1}/_{2} \right]^{\circ} - 5p' \left[1/_{2} \right] \\ 3d \left[2^{1}/_{2} \right]^{\circ} - 4f \left[4^{1}/_{2} \right] \\ 4p' \left[1^{1}/_{2} \right] - 5s \left[1^{1}/_{2} \right]^{\circ} \end{array}$	1-2 1-2 2-1 3-4 1-1
15349 ,52 15329 ,56 15302 ,26 15172 ,33 15046 ,42	10 5 75 22 70	14,10 13,09 14,10 13,27 13,48	14,91 13,90 14,91 14,09 14,30	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 4p \ [^{1}/_{2}] - 5s' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	3-3 2-2 3-3, 4 0-1 0-1
15030,71 14786,29 28	42 2	13,33 14,07	14,15 14,91	$4p' \begin{bmatrix} 1/2 \end{bmatrix} - 3d \begin{bmatrix} 1^{1/2} \end{bmatrix}^{\circ}$ $5s \begin{bmatrix} 1^{1/2} \end{bmatrix}^{\circ} - 4f \begin{bmatrix} 2^{1/2} \end{bmatrix}$	$\begin{array}{c} 1-2 \\ 2-3 \end{array}$

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
14739,11	3	13,17	14,01	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 3d \ [3^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \end{array}$	2-3
14692,39	5	14,06	14,91		2-2, 3
14649,97	60	14,06	14,91		2-3, 4
14634,11 14596,27 14577,51 14257,46 14249,93	80 40 10 50	14,24 14,23 13,30 14,21 13,28	15,08 15,08 14,15 15,08 14,15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3, 4 2-3 2-2 2-3, 4 1-1
14093,61 13992,59 13910,83 13907,41 13866,97	120 10 150 12 20	13,27 13,33 14,01 13,17 14,01	14,15 14,21 14,90 14,06 14,91	$\begin{array}{c} 4p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 3d' \ [^{2}/_{2}]^{\circ} \\ 3d \ [^{3}/_{2}]^{\circ} - 4f \ [^{4}/_{2}] \\ 4p \ [^{1}/_{2}] - 3d \ [^{2}/_{2}]^{\circ} \\ 3d \ [^{3}/_{2}]^{\circ} - 4f \ [^{2}/_{2}] \end{array}$	0-1 $1-2$ $3-4$ $2-2$ $3-3$, 2
13828,79	20	14,01	14,91	$3d [3^{1}/2]^{\circ} - 4f [3^{1}/2]$	$ \begin{array}{c} 3-3, \ 4 \\ 2-2 \\ 3-4 \\ 1-2 \\ 1-2 \end{array} $
13825,99	30	13,17	14,07	$4p [4^{1}/2] - 5s [4^{1}/2]^{\circ}$	
13718,77	1000	13,08	13,98	$4p [2^{1}/2] - 3d [3^{1}/2]^{\circ}$	
13678,53	300	13,33	14,23	$4p' [1/2] - 3d' [4^{1}/2]^{\circ}$	
13622,38	500	13,15	14,06	$4p [4^{1}/2] - 3d [2^{1}/2]^{\circ}$	
13599,18	55	13,30	14,21	$\begin{array}{c} 4p' \left[1^{1}/_{2} \right] - 3d' \left[2^{1}/_{2} \right]^{\circ} \\ 4p' \left[1^{1}/_{2} \right] - 5s' \left[1^{1}/_{2} \right]^{\circ} \\ 4p \left[1^{1}/_{2} \right] - 5s \left[1^{1}/_{2} \right]^{\circ} \\ 4p \left[2^{1}/_{2} \right] - 3d \left[3^{1}/_{2} \right]^{\circ} \\ 4p \left[1^{1}/_{2} \right] - 5s \left[1^{1}/_{2} \right]^{\circ} \end{array}$	2-2
13573,60	25	13,33	14,24		1-0
13543,75	15	13,15	14,07		1-2
13503,99	850	13,09	14,01		2-3
13499,24	50	13,17	14,09		2-1
13406,57 13367,38 13330,32 13313,39 13302,37	250 800 7 600 3	13,98 13,17 13,98 13,28 13,30	14,90 14,10 14,91 14,21 14,23	$\begin{array}{c} 3d \ [3^{1}/_{2}]^{\circ}-4f \ [4^{1}/_{2}] \\ 4p \ [1^{1}/_{2}]-3d \ [2^{1}/_{2}]^{\circ} \\ 3d \ [3^{1}/_{2}]^{\circ}-4f \ [3^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}]-3d^{1} \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}]-3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	4-5 2-3 4-3, 4 1-2 2-2
13273,05	750	13,30	14,24	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 3d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	2—3
13231,37	120	13,15	14,09		1—1
13228,49	200	13,08	14,01		3—3
13214,70	150	12,91	13,84		1—0
13028,27	5	13,28	14,23		1—2
13008,47	200	13,30	14,25	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 3d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \end{array}$	2-1
12956,59	250	12,91	13,86		1-1
12933,33	60	13,28	14,24		1-0
12802,68	300	13,09	14,06		2-2
12746,31	40	13,28	14,25		1-1
12733,59	75	13,09	14,07	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 5s \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 3d' \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 3d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [^{1}/_{2}] - 5s' \; [^{1}/_{2}]^{\circ} \\ 3d \; [2^{1}/_{2}]^{\circ} - 4f' \; [3^{1}/_{2}] \end{array}$	2—2
12702,39	150	13,33	14,30		1—1
12639,01	2	13,17	14,15		2—1
12621,82	6	13,27	14,25		0—1
12596,27	5	14,10	15,08		3—3, 4
12554,44	5	13,08	14,06	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 3d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 5s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 5s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [^{1}/_{2}] - 3d \; [1^{1}/_{2}]^{\circ} \\ 3d \; [1^{1}/_{2}]^{\circ} - 4f \; [1^{1}/_{2}]_{\bullet} \end{array}$	3-2
12487,63	700	13,08	14,07		3-2
12456,05	400	13,09	14,09		2-1
12439,19	500	12,91	13,90		1-2
12419,39	20	13,90	14,90		2-2
12402,88	400	13,15	14,15	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \end{array}$	1—1
12356,82	100	13,90	14,91		2—3
12343,72	150	13,09	14,10		2—3
12151,57	15	14,06	15,08		2—3
12139,79	100	13,28	14,30		1—1
12112,20 12026,63 11943,50 11896,60 11884,47	300 5 25 3 5	13,08 13,27 13,86 13,17 13,86	14,10 14,30 14,90 14,21 14,91	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 3d' \ [4^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 4p \ [4^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \end{array}$	3-3 $ 0-1 $ $ 1-1, 2 $ $ 2-2 $ $ 1-2$

		,			<u> </u>
λ, λ	I	$E_{ m H}^{},~{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
11733,26 11719,51 11708,22 11687,61 11678,47	20 30 3 5 4	13,84 13,09 14,15 13,15 14,15	14,90 14,15 15,21 14,21 15,21	$\begin{array}{c} 3d \ [^{1}/_{2}]^{\circ}-4f \ [1^{1}/_{2}] \\ 4p \ [2^{1}/_{2}]-3d \ [1^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}/_{2}]^{\circ}-5f \ [1^{1}/_{2}] \\ 4p \ [1^{1}/_{2}]-3d' \ [2^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}/_{2}]^{\circ}-5f \ [2^{1}/_{2}] \end{array}$	0-1 $2-1$ $1-1$, 2 $1-2$ $1-2$
11668,72 11580,39 11488,12 11467,57 11441,83	100 8 150 30 80	13,17 14,01 11,83 13,15 13,17	14,23 15,08 12,91 14,23 14,25	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 3d \ [3^{1}/_{2}]^{\circ} - 4f' \ [3^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
11398,63 11393,66 11248,33 11209,67 11195,37	7 50 8 1 2	14,30 13,15 13,15 14,10 13,90	15,39 14,24 14,25 15,20 15,01	$\begin{array}{c} 3d' \left[1^{1}/_{2}\right]^{\circ} - 5f' \left[2^{1}/_{2}\right] \\ 4p \left[1^{1}/_{2}\right] - 5s' \left[1/_{2}\right]^{\circ} \\ 4p \left[1^{1}/_{2}\right] - 5s' \left[1/_{2}\right]^{\circ} \\ 3d \left[2^{1}/_{2}\right]^{\circ} - 6p' \left[1^{1}/_{2}\right] \\ 3d \left[1^{1}/_{2}\right]^{\circ} - 6p \left[1^{1}/_{2}\right] \end{array}$	1—2 1—0 1—1 3—2 2—1
11133,86 11118,75 11106,44 11078,87 11043,13	$20 \\ 20 \\ 60 \\ 200 \\ 2$	14,10 14,10 14,10 13,09 13,90	15,21 15,21 15,21 14,21 15,03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 3-3, 2 3-3, 4 2-2 2-2
11028,60 10977,30 10964,00 10950,74 10947,90	1 1 2 120 20	14,09 14,15 13,90 13,17 13,90	15,21 15,28 15,03 14,30 15,03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—1 2—1 2—1 2—2
10895,9 10892,37 10885,9 10880,96 10861,04	$\begin{array}{c} 1\\30\\2\\150\\25 \end{array}$	14,06 13,08 14,06 13,09 13,09	15,20 14,21 15,20 14,23 14,24	$\begin{array}{c} 3d \ [2^{1}/_{2}] ^{\circ} -6p' \ [^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] -3d' \ [2^{1}/_{2}] ^{\circ} \\ 3d \ [2^{1}/_{2}] ^{\circ} -6p' \ [^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] -3d' \ [1^{1}/_{2}] ^{\circ} \\ 4p \ [2^{1}/_{2}] -3d' \ [2^{1}/_{2}] ^{\circ} \end{array}$	2—1 3—2 2—1 2—2 2—3
10845,43 10837,39 10831,88 10824,00	2 1 1	14,07 14,24 14,24 { 14,23 { 14,24	14,21 15,38 15,38 15,38 15,38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1, 2 3—4 2—3, 2 2—2, 1 2—3
10822,74 10820,18 10812,16 10807,04 10795,91 10773,35	1 6 1 5 2 30	14,15 14,07 14,23 13,86 14,06 13,15	15,30 15,21 15,38 15,01 15,21 14,30	$3d [1^{1}/_{2}]^{\circ} - 7p [1/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 5f [2^{1}/_{2}]$ $3d' [1^{1}/_{2}]^{\circ} - 6f [2^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ} - 6p [1/_{2}]$ $3d [2^{1}/_{2}]^{\circ} - 5f [1^{1}/_{2}]$ $4p [1^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ}$	1-0 2-3, 2 2-3, 2 1-1 2-1, 2 1-1
10770,35 10759,13 10733,87 10732,10 10722,22	15 60 50 2 6	14,06 14,06 14,24 14,24 12,91	15,21 15,21 15,39 15,39 14,06	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 3d' \ [2^{1}/_{2}]^{\circ} - 5f' \ [3^{1}/_{2}] \\ 3d' \ [2^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 4p \ [^{1}/_{2}] - 3d \ [2^{1}/_{2}]^{\circ} \end{array}$	2—3, 2 2—3 3—3, 4 3—3, 2 1—2
10712,77 10700,98 10683,40 10681,78 10673,55	40 80 50 200 500	14,23 13,08 13,09 13,08 12,91	15,39 14,23 14,25 14,24 14,07	$\begin{array}{c} 3d' \ [1^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] - 3d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5s' \ [1/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 3d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-3, 2 3-2 2-1 3-3 1-2
10634,25 10623,38 10615,7 10591,23 10576,18	5 2 1 2 4	13,84 14,21 14,21 13,86 13,86	15,01 15,38 15,38 15,03 15,03	$\begin{array}{c} 3d \ [^{1}/_{2}] ^{\circ} - 6p \ [^{1}/_{2}] \\ 3d' \ [^{2}/_{2}] ^{\circ} - 6f \ [^{2}1/_{2}] \\ 3d' \ [^{2}/_{2}] ^{\circ} - 6f \ [^{3}1/_{2}] \\ 3d \ [^{1}/_{2}] ^{\circ} - 6p \ [^{1}1/_{2}] \\ 3d \ [^{1}/_{2}] ^{\circ} - 6p \ [^{1}1/_{2}] \end{array}$	$ \begin{array}{c} 0-1 \\ 2-3, 2 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $
10529,32 10527,34 10506,47 330	50 2 10 0	14,21 14,21 13,90	15,39 15,39 15,08	$3d' [2^{1}/_{2}]^{\circ} - 5f' [3^{1}/_{2}]$ $3d' [2^{1}/_{2}]^{\circ} - 5f' [2^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ} - 4f' [2^{1}/_{2}]$	2—3 2—3, 2 2—3, 2

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
10478,10 10470,051	200 500	12,91 11,72	14,09 12,91	4p [1/2]—5s [11/2]° 4s' [1/2]°—4p [1/2]	1—1 0—1
10357,6 10332,76 10319,62 10309,15 10266,79	$\begin{array}{c} 1 \\ 60 \\ 2 \\ 20 \\ 1 \end{array}$	13,86 14,01 14,01 14,01 14,07	15,06 15,21 15,21 15,21 15,27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—0 3—4 3—3, 2 3—3, 4 2—3
10254,04 10208,7 10206,9 10171,2 10163,45	10 1 1 1 30	13,09 14,07 14,06 14,06 13,86	14,30 15,28 15,28 15,28 15,08	$4p [2^{1}/_{2}] - 3d' [1^{1}/_{2}]^{\circ}$ $5s [1^{1}/_{2}]^{\circ} - 7p [1^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ} - 7p [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ} - 7p [1^{1}/_{2}]$ $3d [1/_{2}]^{\circ} - 4f' [2^{1}/_{2}]$	2—1 2—1 2—2 2—1 1—2
10104,82 10094,32 10069,04 10052,10 10039,75	$egin{array}{c} 4 \\ 8 \\ 50 \\ 150 \\ 2 \\ \end{array}$	14,15 14,15 13,48 13,98 13,98	15,38 15,38 14,71 15,21 15,21	$3d [1^{1}/_{2}]^{\circ}-6f [1^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ}-6f [2^{1}/_{2}]$ $4p' [^{1}/_{2}]-4d [^{1}/_{2}]^{\circ}$ $3d [3^{1}/_{2}]^{\circ}-5f [4^{1}/_{2}]$ $3d [3^{1}/_{2}]^{\circ}-5f [2^{1}/_{2}]$	1-1, 2 1-2 0-1 4-4, 5 4-3
10029,70 10007,61 9994,94 9951,88 9937,80	40 3 1 20 1	13,98 14,15 14,21 12,91 14,23	15,21 15,39 15,45 14,15 15,48	$\begin{array}{c} 3d \ [3^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 3d' \ [2^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 4p \ [1/_{2}] - 3d \ [1^{1}/_{2}]^{\circ} \\ 3d' \ [1^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	$\begin{array}{c} 4-3,\ 4\\ 1-2\\ 2-1\\ 1-1\\ 2-3,\ 2 \end{array}$
9882 ,18 9815 ,22 9800 ,92 9784 ,5010 9774 ,79	6 1 4 1000 1	14,30 14,01 14,01 11,83 14,21	15,56 15,27 15,28 13,09 15,48	$\begin{array}{c} 3d' \ [1^{1}/_{2}]^{\circ} - 6f' \ [2^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 3d' \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \end{array}$	1-2 3-3 3-2 1-2 2-3
9677,80 9673,39 9666,86 9657,7841 9595,09	8 6 50 1500 4	14,10 14,10 14,10 11,62 14,10	15,38 15,38 15,38 12,91 15,39	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 5f' \ [3^{1}/_{2}] \end{array}$	3-4 3-3, 2 3-3, 4 1-1 3-3, 4
9593,67 9561,60 9555,2 9547,73 9486,02	1 5 4 2 3	14,10 13,98 13,90 13,90 12,91	15,39 15,27 15,20 15,20 14,21	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} -5f' \ [2^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} -7p \ [2^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} -6p' \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} -6p' \ [^{1}/_{2}] \\ 4p \ [^{1}/_{2}] -3d' \ [2^{1}/_{2}]^{\circ} \end{array}$	3-3, 2 4-3 2-1 2-1 1-2
9478,39 9459,09 9446,57 9408,66 9402,69	50 100 2 3 20	13,90 13,90 14,07 14,06 14,06	15,21 15,21 15,38 15,38 15,38	$\begin{array}{c} 3d \ [1^{1}/_{2}] ^{\circ} -5f \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}] ^{\circ} -5f \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] ^{\circ} -6f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}] ^{\circ} -6f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}] ^{\circ} -6f \ [3^{1}/_{2}] \end{array}$	$\begin{array}{c} 2-1,\;2\\ 2-3,\;2\\ 2-3,\;2\\ 2-3,\;2\\ 2-3\end{array}$
9377,63	5	14,24	15,56	$ \left\{ \begin{array}{l} 3d' \ [2^{1}/_{2}]^{\circ} - 6f' \ [2^{1}/_{2}] \\ 3d' \ [2^{1}/_{2}]^{\circ} - 6f' \ [3^{1}/_{2}] \\ 3d' \ [41/_{2}]^{\circ} - 6f' \ [3^{1}/_{2}] \end{array} \right. $	3-3, 2 $ 3-3, 4 $ $ 2-3, 2$
9362,50	4	14,23	15,56	$ \begin{cases} 3d' \ [1^{1/2}] \circ -6f' \ [2^{1/2}] \\ 3d' \ [1^{1/2}] \circ -6f \ [3^{1/2}] \\ 4s' \ [1^{1/2}] \circ -4p \ [1^{1/2}] \end{cases} $	2—3, 2 2—3 1—1
9354 ,218 9340 ,59 9334 ,80	200 3 8	11,83 12,91 14,15 14,06	13,15 14,23 15,48 15,39	$\begin{array}{c} 4s & [7_2] - 4p & [17_2] \\ 4p & [1/_2] - 3d' & [1^{1}/_2]^{\circ} \\ 3d & [1^{1}/_2]^{\circ} - 7f & [1^{1}/_2] \\ 3d & [2^{1}/_2]^{\circ} - 5f' & [3^{1}/_2] \end{array}$	$\begin{array}{c} 1 - 2 \\ 1 - 1, 2 \\ 2 - 3 \end{array}$
9333,32 9328,08 9291,58 9242,17 9224,495	1 2 100 1 5 1000	14,06 14,15 12,91 13,86 11,83	15,39 15,48 14,24 15,20 13,17	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} -5f' \ [2^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} -7f \ [2^{1}/_{2}] \\ 4p \ [^{1}/_{2}] -5s' \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} -6p' \ [1^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} -4p \ [1^{1}/_{2}] \end{array}$	$egin{array}{c} 2-3,\ 2\ 2-2\ 1-0\ 1-2\ 1-2 \end{array}$
9221 ,08 9198 ,61 9194 ,637	5 50 1 50	14,21 13,86 12,91	15,56 15,21 14,25	$3d' [2^{1}/_{2}]^{\circ} -6f' [3^{1}/_{2}]$ $3d [^{1}/_{2}]^{\circ} -5f [1^{1}/_{2}]$ $4p [^{1}/_{2}] -5s' [^{1}/_{2}]^{\circ}$	2—3 1—1, 2 1—1

λ, Â	I	E_{H} , eV	$E_{_{ m B}},~{ m eV}$	Transition	J
9180,17 9122,9660	6 500	13,86 11,55	15,21 12,91	$3d [1/2]^{\circ} -5f [2^{1}/2]$ $4s [1^{1}/2]^{\circ} -4p [1/2]$	$\begin{array}{c} 1-2 \\ 2-1 \end{array}$
9111,3 9075,42 9073,34 9066,77 9057,51	$\begin{array}{c} 1 \\ 60 \\ 50 \\ 40 \\ 2 \end{array}$	13,86 13,33 13,84 14,01 13,48	15,22 14,69 15,21 15,38 14,85	$\begin{array}{c} 3d \ [^{1}/_{2}]^{\circ}-6p' \ [^{1}/_{2}] \\ 4p' \ [^{1}/_{2}]-4d \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ}-5f \ [1^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ}-6f \ [4^{1}/_{2}] \\ 4p' \ [0^{1}/_{2}]-6s \ [1^{1}/_{2}]^{\circ} \end{array}$	1-0 1-0 0-1 3-4 0-1
9057, 23 8994, 09 8992, 84 8988, 20 8970, 98	$egin{matrix} 4 \\ 10 \\ 1 \\ 3 \\ 2 \end{bmatrix}$	14,01 14,01 14,01 13,90 14,10	15,38 15,39 15,39 15,28 15,48	$\begin{array}{c} 3d \ [3^{1}/_{2}] - 6f \ [3^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 5f' \ [3^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 3d \ [4^{1}/_{2}]^{\circ} - 7p \ [4^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \end{array}$	3-3, 4 3-3, 4 3-3, 2 2-2 3-4
8967,39 8964,48 8962,19 8895,42 8891,70	$\begin{array}{c} 2 \\ 10 \\ 40 \\ 1 \\ 1 \end{array}$	14,10 14,10 13,33 14,15 14,15	15,48 15,48 14,71 15,54 15,55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3, 2 3-3, 4 1-1 1-1, 2 1-2
8874,84 8849,97 8846,17 8840,82 8840,39	4 150 1 20 3	12,91 13,98 13,98 13,98	14,30 15,38 15,38 15,38	$4p \ [^{1}/_{2}] - 3d' \ [^{1}/_{2}]^{\circ}$ $3d \ [^{3}/_{2}]^{\circ} - 6f \ [^{4}/_{2}]$ $3d \ [^{3}/_{2}]^{\circ} - 6f \ [^{2}/_{2}]$ $3d \ [^{3}/_{2}]^{\circ} - 6f \ [^{3}/_{2}]$ $-$	1—1 4—4, 5 4—3 4—3, 4
8819,37 8805,16 8799,082 8784,59 8761,6907	$\begin{array}{c} 1\\ 3\\ 100\\ 30\\ 200 \end{array}$	14,15 13,86 13,30 13,28 13,33	15,56 15,27 14,71 14,69 14,74	$\begin{array}{c} 3d \left[1^{1}/_{2}\right]^{\circ}-6f' \left[2^{1}/_{2}\right] \\ 3d \left[1^{1}/_{2}\right]^{\circ}-7p \left[1^{1}/_{2}\right] \\ 4p' \left[1^{1}/_{2}\right]-4d \left[1^{1}/_{2}\right]^{\circ} \\ 4p' \left[1^{1}/_{2}\right]-4d \left[1^{1}/_{2}\right]^{\circ} \\ 4p' \left[1^{1}/_{2}\right]-4d \left[1^{1}/_{2}\right]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-1 \\ 1-0 \\ 1-2 \end{array} $
8741,26 8739,51 8736,63 8736,19 8713,79	$\begin{array}{c} 1 \\ 3 \\ 20 \\ 2 \\ 5 \end{array}$	13,86 14,06 14,06 13,86 14,27	15,28 15,48 15,48 15,28 15,66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 2—3, 2 2—3 1—2 3—3, 2
8700,95 8690,12 8678,43 8667,9438 8642,89	3 2 60 400 1	14,23 13,84 13,28 11,72 13,86	15,66 15,27 14,71 13,15 15,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3, 2 0—1 1—1 0—1 1—0
8620,4602 8605,7790 8579,49 8578,06 8565,13	100 150 4 5 1	13,27 13,30 14,21 11,83 14,10	14,71 14,74 15,66 13,27 15,55	$\begin{array}{c} 4p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{11}/_{2}] - 4d \ [^{11}/_{2}] ^{\circ} \\ 3d' \ [^{21}/_{2}] ^{\circ} - 7f' \ [^{31}/_{2}] \\ 4s' \ [^{1}/_{2}] ^{\circ} - 4p \ [^{1}/_{2}] \\ 3d \ [^{21}/_{2}] ^{\circ} - 8f \ [^{41}/_{2}] \end{array}$	0—1 2—2 2—3 1—0 3—4
8563,38 8561,38 8521,4428 8496,64 8490,30	1 3 2000 2 40	14,10 14,10 11,83 14,10 13,28	15,55 15,55 13,28 15,56 14,74	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 8f \ [3^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ \begin{cases} 3d \ [2^{1}/_{2}]^{\circ} - 6f' \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 6f' \ [3^{1}/_{2}] \\ 4p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \end{array}$	3-3, 2 3-3, 4 1-1 3-3, 4 3-3, 4 1-2
8443,44 8440,26 8437,71 8424,6473 8408,2094	20 1 6 2500 3000	14,01 14,01 14,01 11,62 11,83	15,48 15,48 15,48 13,09 13,30	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 3-3, 2 3-3, 4 1-2 1-2
8399,35 8392,28 8384,73 8367,03 8355,30	20 80 60 3	13,90 13,90 13,30 13,33 14,06	15,38 15,38 14,78 14,81 15,55	$\begin{array}{c} 3d \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-1, 2 \\ 2-3, 2 \\ 2-3 \\ 1-2 \\ 2-3, 2 \end{array} $

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λ, Α	I	E _H , eV	E _B , eV	Transition	J
8353,50 8332,21 8305,02 8303,79 8291,88	4 20 1 1 8	14,06 13,90 14,10 14,10 14,06	15,55 15,39 15,59 15,55 15,56	$3d [2^{1}/_{2}]^{\circ}$ — $8f [3^{1}/_{2}]$ $3d [4^{1}/_{2}]^{\circ}$ — $5f' [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}$ — $9f [2^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}$ — $9f [3^{1}/_{2}]$ $3d [2^{1}/_{2}]^{\circ}$ — $6f' [3^{1}/_{2}]$	2-3 2-3, 2 3-3, 2 3-3, 4 2-3
8264,5221 8255,07 8249,58 8224,72 8203,42	1500 50 4 6 20	11,83 13,98 13,98 13,30 13,33	13,33 15,48 15,48 14,81 14,84	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ}-4p' \ [^{1}/_{2}] \\ 3d \ [^{31}/_{2}]^{\circ}-7f \ [^{41}/_{2}] \\ 3d \ [^{31}/_{2}]^{\circ}-7f \ [^{31}/_{2}] \\ 4p' \ [^{11}/_{2}]-4d \ [^{21}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}]-6s \ [^{11}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 1-1 \\ 4-4, 5 \\ 4-3, 4 \\ 2-2 \\ 1-2 \end{array} $
8178,96 8178,84 8171,95 8151,86 8143,54	20 40 10 3 10	13,86 13,86 13,33 13,30	15,38 15,38 14,85 14,82	$\begin{array}{c} 3d \ [^{1}/_{2}]^{\circ} - 6f \ [^{1}/_{2}] \\ - \\ 3d \ [^{1}/_{2}]^{\circ} - 6f \ [^{2}/_{2}] \\ 4p' \ [^{1}/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 4d \ [^{2}/_{2}]^{\circ} \end{array}$	1-1, 2 - 1-2 1-1 2-2, 3
8119,18 8115,3108 8103,6920 8094,06 8089,93	50 5000 2000 20 5	13,28 11,55 11,62 13,33 14,01	14,81 13,08 13,15 14,86 15,55	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p \ [1^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 3d \ [3^{1}/_{2}]^{\circ} - 8f \ [4^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1-2 \\ 2-3 \\ 1-1 \\ 1-1 \\ 3-4 \end{array} $
8079,68 8066,60 8053,305 8046,13 8037,23	20 20 100 50 20	{ 13,84 14,01 13,30 13,17 13,15 13,48	15,38 15,55 14,84 14,71 14,69 15,02	$\begin{array}{c} 3d \ [^{1}/_{2}\]^{\circ}-6f \ [^{1}/_{2}\] \\ 3d \ [^{3}/_{2}\]^{\circ}-8f \ [^{3}/_{2}\] \\ 4p' \ [^{1}/_{2}\]-6s \ [^{4}/_{2}\]^{\circ} \\ 4p \ [^{1}/_{2}\]-4d \ [^{1}/_{2}\]^{\circ} \\ 4p \ [^{1}/_{2}\]-4d \ [^{1}/_{2}\]^{\circ} \\ 4p' \ [^{1}/_{2}\]-6s' \ [^{1}/_{2}\]^{\circ} \end{array}$	0-1 $3-3$, 4 $2-2$ $2-1$ $1-0$ $0-1$
8021,9 8014,7853 8006,1566 7965,08 7960,84		14,01 11,55 11,62 13,28 13,30	15,56 13,09 13,17 14,84 14,86	$3d [3^{1}/_{2}]^{\circ}-6f' [3^{1}/_{2}]$ $4s [4^{1}/_{2}]^{\circ}-4p [2^{1}/_{2}]$ $4s [4^{1}/_{2}]^{\circ}-4p [1^{1}/_{2}]$ $4p' [4^{1}/_{2}]-6s [4^{1}/_{2}]^{\circ}$ $4p' [4^{1}/_{2}]-4d [4^{1}/_{2}]^{\circ}$	3-3, 4 2-2 1-2 1-2 2-1
7956,99 7948,1755 7916,45 7910,23 7906,91	10 400 20 4 1	13,15 11,72 13,28 13,98 13,98	14,71 13,28 14,85 15,55 15,55	$4p [1^{1}/_{2}]-4d [^{1}/_{2}]^{\circ}$ $4s' [^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $4p' [1^{1}/_{2}]-6s [1^{1}/_{2}]^{\circ}$ $3d [3^{1}/_{2}]^{\circ}-8f [4^{1}/_{2}]$ $3d [3^{1}/_{2}]^{\circ}-8f [3^{1}/_{2}]$	$ \begin{array}{c} 1-1 \\ 0-1 \\ 1-1 \\ 4-4, 5 \\ 4-3, 4 \end{array} $
7891,0777 7868,20 7861,91 7860,44 7855,73	100 40 15 2 8	13,17 13,27 13,28 13,90 13,90	14,74 14,85 14,86 15,48 15,48	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6s \ [4^{1}/_{2}]^{\circ} \\ 4p' \ [4^{1}/_{2}] - 4d \ [4^{1}/_{2}]^{\circ} \\ 3d \ [4^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 3d \ [4^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-1 \\ 2-1 \\ 3-3 \end{array} $
7853,29 7814,33 7798,55 7724,2064 7723,7599		14,01 13,27 13,15 11,72 11,55	15,59 14,86 14,74 13,33 13,15	$\begin{array}{c} 3d \left[3^{1}/_{2} \right]^{\circ} - 9f \left[4^{1}/_{2} \right] \\ 4p \left[^{1}/_{2} \right] - 4d \left[1^{1}/_{2} \right]^{\circ} \\ 4p \left[1^{1}/_{2} \right] - 4d \left[1^{1}/_{2} \right]^{\circ} \\ 4s' \left[^{1}/_{2} \right]^{\circ} - 4p' \left[^{1}/_{2} \right] \\ 4s \left[1^{1}/_{2} \right]^{\circ} - 4p \left[1^{1}/_{2} \right] \end{array}$	3-4 0-1 1-2 0-1 2-1
7704,81 7690,10 7670,04 7667,03 7662,3	20 2 50 4 2	13,17 13,98 13,09 13,86 13,86	14,78 15,59 14,71 15,48 15,48	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 3d \ [3^{1}/_{2}]^{\circ} - 9f \ [4^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	$\begin{array}{c} 2-3 \\ 4-4 \\ 5 \\ 2-1 \\ 4-1 \\ 2 \\ 1-2 \end{array}$
7635,1056 7628,86 7618,33 7514,6514 7510,42	50 30 4 200 10	11,55 13,33 13,33 11,62 13,30	13,17 14,95 14,95 13,27 14,95	$4s \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 4d' \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 4d' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ}$ $4s \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 4d' \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 4d' \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-2 \\ 1-2 \\ 1-0 \\ 2-2 \\ 1-0 \end{array} $
7503,8685 7484,24 7471,1676	15	11,83 13,15 11,62	13,48 14,81 13,28	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p \ [^{1}/_{2}] - 4d \ [^{2}/_{2}]^{\circ} \\ 4s \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1 - 0 \\ 1 - 2 \\ 1 - 1 \end{array} $

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E_{B} , eV	Transition	J
7436,25 7435,33	10 30	13,08 13,17	14,74 14,84	4p [2 ¹ / ₂]—4d [1 ¹ / ₂]° 4p [1 ¹ / ₂]—6s [1 ¹ / ₂]°	$\begin{array}{c} 3-2 \\ 2-2 \end{array}$
7425,290 7422,26 7412,334 7392,97 7383,9796	12 6 15 15 400	13,30 13,28 13,28 13,17 11,62	14,97 14,95 14,95 14,85 13,30	$\begin{array}{c} 4p' \; [1^{1}/_{2}] - 4d' \; [2^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 4d' \; [2^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 4d' \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 6s \; [1^{1}/_{2}]^{\circ} \\ 4s \; [1^{1}/_{2}]^{\circ} - 4p' \; [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 1 - 2 \\ 2 - 1 \\ 1 - 2 \end{array} $
7372,1189 7353,316 7350,78 7345,34 7316,0068	100 100 6 1 30	13,08 { 13,09 13,15 13,33 13,17 13,33	14,76 14,78 14,84 15,01 14,86 15,02	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 6s' \ [1/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 6s' \ [1/_{2}]^{\circ} \end{array}$	3-4 $ 3-4 $ $ 1-2 $ $ 1-0 $ $ 2-1 $ $ 1-1$
7311,724 7284,44 7272,9349 7270,66 7267,20	100 6 100 10 2	13,15 13,30 11,62 13,08 13,48	14,85 15,00 13,33 14,78 15,18	$\begin{array}{cccccccccccccccccccccccccccccccccccc$: -1 : -1 1 -1 3 -3 01
7265,173 7229,93 7206,9812 7202,55 7176,34	3 4 100 2 4	13,15 13,09 13,30 13,28	14,86 14,81 15,02 15,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 2-2 2-1 1-1
7162,57 7158,83 7147,0408 7125,825 7107,4777	8 30 30 30 200	13,27 13,28 11,55 13,28 13,09	15,00 15,01 13,28 15,02 14,84	$\begin{array}{c} 4p \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 4s \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p' \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}1/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $1-0$ $2-1$ $1-1$ $2-2$
7086,70 7068,73 7067,2175 7030,2519 6992,17	15 30 400 100 4	13,27 13,09 11,55 13,09 13,33	15,02 14,85 13,30 14,84 15,10	$\begin{array}{c} 4p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{2}1/_{2}] - 6s \ [^{1}1/_{2}] ^{\circ} \\ 4s \ [^{1}1/_{2}] ^{\circ} - 4p' \ [^{1}1/_{2}] \\ 4p \ [^{2}1/_{2}] - 6s \ [^{1}1/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}] ^{\circ} \end{array}$	0-1 $2-1$ $2-2$ $3-2$ $1-0$
6965,4304 6960,23 6951,46 6937,6658 6925,010	$400 \\ 20 \\ 20 \\ 100 \\ 2$	11,55 13,17 13,17 12,91 13,33	13,33 14,95 14,95 14,69 15,12	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 2-2 \\ 1-0 \\ 1-1 \end{array} $
6888,1704 6887,10 6879,59 6871,2898 6851,884	100 20 40 150 4	13,15 13,17 13,15 12,91 13,33	14,95 14,97 14,95 14,71 15,14	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-2 \\ 1-1 \\ 1-2 \end{array} $
6827,2529 6818,291 6779,933 6766,6134 6756,10	30 4 4 100 100	13,30 13,28 13,48 13,17 13,30	15,12 15,10 15,31 15,00 15,14	$4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 5d \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 5d \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1/_{2} \end{bmatrix} - 6d \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ}$ $4p \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 4d' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 5d \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ}$	$ \begin{array}{r} 2-1 \\ 1-0 \\ 0-1 \\ 2-1 \\ 2-2 \end{array} $
6754,30 6752,8347 6722,893 6719,2193 6698,8752	8 100 4 100 100	13,28 12,91 13,30 13,27 13,17	15,12 14,74 15,15 15,12 15,02	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 5d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [1^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d \ [3^{1}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [1^{1}/_{2}] - 6s' \ [^{1}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 2 - 3 \\ 0 - 1 \\ 2 - 1 \end{array} $
6698,474 6689,91 6684,73 6677,2812 6672,10	$\begin{array}{c} 6 \\ 2 \\ 6 \\ 30 \\ 2 \end{array}$	13,15 13,33 13,28 11,62 13,09	45,00 45,48 15,14 13,48 14,95	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \end{array}$	1—1 1—2 2—2 1—0 2—2
3 34					

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λ, Â	I	$E_{ m H}^{}$, eV	$E_{_{ m B}},{ m eV}$	Transition	J
6664,0533 6660,6784 6656,88 6632,087 6604,8542	100 100 6 8 30	13,09 13,15 13,33 13,15 13,09	14,95 15,01 15,19 15,02 14,97	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [4^{1}/_{2}] - 6s' \ [1/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 4p \ [4^{1}/_{2}] - 6s' \ [1/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 1-0 \\ 1-1 \\ 1-1 \\ 2-3 \end{array} $
6604,02 6598,684 6596,1155 6594,66 6581,60	2 6 8 2 2	13,08 { 13,30 13,28 13,08 13,48 13,30	14,95 15,18 15,16 14,95 15,36 15,18	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}] ^{\circ} \\ 4p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}] ^{\circ} \\ 4p' \ [1/_{2}] - 7s' \ [1/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}] ^{\circ} \end{array}$	3-2 2-2 1-2 3-2 0-1 2-1
6571,37 6538,1137 6530,52 6513,848 6499,109	$\begin{array}{c} 2\\ 30\\ 1\\ 8\\ 6 \end{array}$	13,48 13,08 13,28 13,28 13,28	15,37 14,95 15,18 15,18 15,19	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	0—1 3—2 3—2 1—1 1—1
6493,971 6481,141 6466,5505 6431,559 6416,3075	15 8 20 1 5 100	13,09 13,27 13,27 13,09 12,91	15,00 15,18 15,19 15,02 14,84	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \end{array}$	2—1 0—1 0—1 2—1 1—2
6384,7189 6369,5783 6364,8945 6349,20 6309,14	100 30 20 2 8	12,91 13,17 13,15 12,91 13,15	14,85 15,12 15,10 14,86 15,12	$\begin{array}{c} 4p \ [^{1}/_{2}] - 6s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	1—1 2—1 1—0 1—1 1—1
6307,6598 6296,8762 6278,652 6259,41 6248,4064	30 20 6 1 15	13,17 13,33 13,17 13,33 13,15	15,14 15,30 15,15 15,31 15,14	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 1-2 2-3 1-1 1-2
6243,3958 6230,928 6215,9423 6212,5044 6179,41	6 4 60 100 4	13,33 13,17 13,30 13,17 13,30	15,31 15,16 15,30 15,17 15,31	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	1-0 2-2 2-2 2-3 2-1
6173,0980 6170,1761 6165,123 6155,2393 6145,4432	100 100 8 60 100	13,15 13,17 13,30 { 13,17 13,28 13,30	15,16 15,18 15,31 15,18 15,30 15,32	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-2 \\ 2-1 \\ 1-2 \\ 2-3 \end{array} $
6142,05 6128,726 6127,416 6121,86 6119,662	1 8 15 1 2	13,17 13,33 13,09 13,33 13,28	15,19 15,35 15,12 15,35 15,31	$\begin{array}{c} 4p \; [1^{1}/_{2}] - 5d \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 5d' \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 5d \; [^{1}/_{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 6d \; [2^{1}/_{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 6d \; [^{1}/_{2}]^{\circ} \end{array}$	2-1 1-1 2-1 1-2 1-1
6113,463 6105,6354 6104,60 6101,16 6098,8046	8 60 6 6	13,15 13,28 13,28 13,33 13,33 13,15	15,18 15,31 15,31 15,36 15,36 14,18	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-0 \\ 1-0 \\ 1-1 \\ 1-1 \end{array} $
6093,33 6090,7865 6085,86 6081,245 6064,758	1 10 2 4 6	13,33 { 13,27 13,48 13,15 13,33 13,30	15,36 15,31 15,51 15,19 15,35 15,35	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d \ [^{3}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 0-1 \\ 1-1 \\ 1-1 \\ 2-3 \end{array} $

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
6059 ,3735 6052 ,7234 6045 ,34 6043 ,2254	100 30 1 100	12,91 12,91 13,30 13,09 13,30	14,95 14,95 15,35 15,15 15,35	$\begin{array}{c} 4p \ [^{1}/_{2}] - 4d' \ [^{21}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 4d' \ [^{11}/_{2}] ^{\sigma} \\ 4p' \ [^{11}/_{2}] - 6d \ [^{21}/_{2}] ^{\circ} \\ 4p \ [^{21}/_{2}] - 5d \ [^{31}/_{2}] ^{\circ} \\ 4p' \ [^{11}/_{2}] - 6d \ [^{21}/_{2}] ^{\circ} \\ 4p' \ [^{21}/_{2}] - 5d \ [^{31}/_{2}] ^{\circ} \end{array}$	1—2 1—2 2—2 2—3 2—3 3—4
6032,1291 6025,1515 6017,53 6013,6790 6005,7246 5999,0004	60 10 1 6 4 20	13,08 13,30 13,30 13,08 13,30 13,09	15,13 15,36 15,36 15,14 15,37 15,16	$4p [2^{-}/2] - 3d [3^{-}/2]$ $4p' [1^{1}/2] - 7s' [1/2]^{\circ}$ $4p' [4^{1}/2] - 8s [1^{1}/2]^{\circ}$ $4p [2^{1}/2] - 5d [1^{1}/2]^{\circ}$ $4p [1^{1}/2] - 8s [1^{1}/2]^{\circ}$ $4p [2^{1}/2] - 5d [2^{1}/2]^{\circ}$	2—1 2—2 3—2 2—1 2—2
5994,66 5988,11 5987,3027 5981,90 5971,6036	2 2 40 5 5	13,28 13,28 13,08 13,09 13,28	15,35 15,35 15,15 15,17 15,36	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \end{array}$	1—1 1—2 3—3 2—3 1—0
5968,31 5949,2595 5943,89 5942,6722 5940,86	1 10 2 40 2	13,28 13,28 13,08 13,09 13,27	15,36 15,35 15,16 15,18 15,36	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 7s' \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{2}/_{2}] - 5d \ [^{2}/_{2}] ^{\circ} \\ 4p \ [^{2}/_{2}] - 7s \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}] ^{\circ} \end{array}$	1—1 1—1 3—2 2—2 0—1
5928 ,8124 5927 ,13 5916 ,58 5912 ,0861 5888 ,5851	200 10 5 500 300	13,09 13,08 13,09 12,91 13,08	15,18 15,17 15,19 15,00 15,18	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	2—1 3—3 2—1 1—1 3—2
5882,6250 5870,26 5860,3118 5843,74 5834,2660	$ \begin{array}{r} 100 \\ 2 \\ 60 \\ 2 \\ 60 \end{array} $	12,91 13,33 12,91 13,33 13,17	15,01 15,44 15,02 15,45 15,30	$\begin{array}{c} 4p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 7d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 7d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 2 - 2 \end{array} $
5802,0809 5790,39 5789,477 5783,541 5774,00	40 5 20 40 40	13,17 13,30 13,17 13,15 13,30	15,31 15,44 15,31 15,30 15,45	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 6d \ [1/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 2-1 \\ 2-2 \\ 1-2 \\ 2-2 \end{array} $
5772,1160 5758,84 5747,18 5739,5207 5738,416	100 5 2 500 20	13,17 13,30 13,28 13,15 13,15	15,32 15,45 15,44 15,31 15,31	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}] ^{\circ} \\ 4p' \ [4^{1}/_{2}] - 7d \ [3^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7d \ [^{1}/_{2}] ^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}] ^{\circ} \\ 4p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 2 - 3 \\ 1 - 0 \\ 1 - 2 \\ 1 - 0 \end{array} $
5737,96 5712,48 5700,874 5693,10 5689,91	5 1 60 1 200	13,28 13,27 13,17 13,28 13,33	15,44 15,44 15,35 15,46 15,51	$4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 7d \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ}$ $4p \begin{bmatrix} 1/_{2} \end{bmatrix} - 7d \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ}$ $4p \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 6d \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 7d \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}^{\circ}$ $4p' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 6d' \begin{bmatrix} 1^{1}/_{2} \end{bmatrix}^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 2 - 3 \\ 1 - 2 \\ 1 - 2 \end{array} $
5689,64 5687,40 5683,73 5681,9014 5674,73	200 20 40 500 1	13,17 	15,35 — 15,35 15,35 15,51	$4p [1^{1}/_{2}]-5d' [1^{1}/_{2}]^{\circ}$ $ 4p [1^{1}/_{2}]-6d [2^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}]-6d [2^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}]-6d' [2^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-1 \\ -1 \\ 2-2 \\ 2-3 \\ 1-2 \end{array} $
5667,40 5665,82 5663,80 5662,00 5659,1278 5650,7054	1 5 1 5 500 1500	{ 13,28 13,33 13,17 13,28 13,28 13,17 12,91	15,47 15,51 15,36 15,47 15,47 15,36 15,10	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7s' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-1 \\ 1-1 \\ 1-1 \\ 2-2 \\ 1-0 \end{array} $
5648,66 336	200	13,17	15,10	4p [1/2] - 3a [1/2] 4p [11/2] - 8s [11/2]°	$\begin{array}{c} 1 - 0 \\ 2 - 1 \end{array}$

λ, Å	I	E_{H} , eV	$E_{\mathbf{B}}$, eV	Transition	J
5641 ,34 5639 ,41 5637 ,29	60 100 20	13,15 13,27 13,27	15,35 15,47 15,47	$4p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ}$ $4p \ [^{1}/_{2}] - 9s \ [^{1}/_{2}]^{\circ}$ $4p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ}$	1-1 0-1 0-1
5635,575 5630,44 5623,778 5620,89 5620,636	60 10 60 60 2	13,45 13,09 13,30 13,45 13,33	45,35 45,30 15,51 45,36 45,53	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1/^{1}_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d' \ [^{1}/_{2}]^{\circ} \end{array}$	1-2 $2-2$ $2-2$ $1-0$ $1-1$
5619,00 5618,010 5611,35 5608,90 5606,7341	5 60 20 20 500	13,15 13,15 13,30 12,91	 15,36 15,36 15,51 15,12	$\begin{array}{c} - \\ 4p \ [1^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	- 1-1 1-2 2-2 1-1
5605,25 5604,36 5601,85 5601,08 5600,43	5 20 2 60 40	13,33 13,33 13,30 13,15 13,09	15,53 15,54 15,51 15,35 15,31	$4p'$ [$^{1}/_{2}$] $-8d$ [$^{1}/_{2}$] $^{\circ}$ $4p'$ [$^{1}/_{2}$] $-8s'$ [$^{1}/_{2}$] $^{\circ}$ $4p'$ [$^{1}/_{2}$] $-8d$ [$^{1}/_{2}$] $^{\circ}$ $4p$ [$^{1}/_{2}$] $-6d$ [$^{1}/_{2}$] $^{\circ}$ $4p$ [$^{2}/_{2}$] $-6d$ [$^{1}/_{2}$] $^{\circ}$	1-1 1-0 2-1 1-1 2-1
5598,50 5597,4783 5591,75 5588,7213	20 500 5 500	$ \begin{array}{r} 13,33 \\ 13,30 \\ - \\ 13,09 \end{array} $	15,54 15,51 — 15,31	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}]^{\circ} \\ - \\ 4p \ [^{2}/_{2}] - 5d' \ [^{2}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 1-1 \\ 2-2 \\ - \\ 2-2 \end{array} $
5581,83 5574,20 5572,5428	60 5 500 5	13,08 13,28 13,09	15,30 15,51 15,32	$4p [2^{1/2}] - 5d' [1^{1/2}]^{\circ}$ $4p' [1^{1/2}] - 6d' [1^{1/2}]^{\circ}$ $4p [2^{1/2}] - 5d' [2^{1/2}]^{\circ}$	3—2 1—2 2—3
5565,96 5560,22 5559,62	10 200	$\begin{array}{c} -13,30 \\ 13,28 \end{array}$	15,53 15,51	$4p' [1^{1}/_{2}] - 8d [3^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 6d' [2^{1}/_{2}]^{\circ}$	$\begin{array}{c} - \\ 2-3 \\ 1-2 \end{array}$
5558,7031 5553,40 5552,76 5542,73 5541,46	$500 \\ 2 \\ 10 \\ 2 \\ 2$	12,91 13,30 13,30 13,28 13,30	15,14 15,53 15,53 15,51 15,54	$\begin{array}{c} 4p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 8d \ [^{2}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 8d \ [^{2}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 8d \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 10s \ [^{1}/_{2}] ^{\circ} \end{array}$	1—2 2—2 2—2 1—1 2—2
5540,90 5534,45 5528,93 5524,9598 5523,70	40 60 40 300 5	{ 13,08 13,30 13,30 13,27 13,08 13,33	15,31 15,53 15,54 15,51 15,32 15,57	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 5d' \; [2^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 8d \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 8s' \; [^{1}/_{2}]^{\circ} \\ 4p \; [^{1}/_{2}] - 8d \; [^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 5d' \; [2^{1}/_{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 9d \; [^{1}/_{2}]^{\circ} \end{array}$	3-2 2-1 2-1 0-1 3-3 1-0
5518,20 5507,63 5506,1149 5505,18 5499,00	5 10 500 10 10	13,33 13,28 13,09 13,28 12,91	15,57 15,53 15,35 15,53 15,16	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 9d \ [^{1}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 6d' \ [^{1}/_{2}] ^{\circ} \\ 4p \ [^{2}/_{2}] - 6d \ [^{3}/_{2}] ^{\circ} \\ 4p' \ [^{1}/_{2}] - 8d' \ [^{2}/_{2}] ^{\circ} \\ 4p \ [^{1}/_{2}] - 5d \ [^{2}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{c} 1-1 \\ 1-1 \\ 2-3 \\ 1-2 \\ 1-2 \end{array} $
5495,876 5493,49 5492,06 5490,122 5488,46	1000 20 40 60 2	13,08 13,28 13,28 13,09 13,09	15,33 15,54 15,54 15,35 15,35	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 6d \ [3^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}] ^{\circ} \\ 4p' \ [1^{1}/_{2}] - 8s' \ [^{1}/_{2}] ^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}] ^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 3-4 \\ 1-2 \\ 1-0 \\ 2-2 \\ 2-3 \end{array} $
5486,47 5483,32 5473,455 5469,65	20 10 500 20	13,28 13,27 13,09	15,54 15,54 15,36	$4p' [1^{1}/_{2}] - 8s' [1/_{2}]^{\circ}$ $4p [1^{1}/_{2}] - 8s' [1/_{2}]^{\circ}$ $4p [2^{1}/_{2}] - 7s' [1/_{2}]^{\circ}$	1-1 0-1 2-1 -
5467,1626 5467,1626 5459,61 5457,75 5457,4158 5456,01 5451,6538	60 20 40 3 200 5	13,09 13,08 13,17 13,09 13,30 12,91	15,36 15,35 15,44 15,35 15,57 15,18	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	2—1

λ, À	I	$E_{ m H}$, eV	E _B , eV	Transition	J
5448,61 5443,88 5443,21 5442,22 5439,9903	10 20 100 500 500	13,30 13,08 13,17 13,08 12,91	15,58 15,35 15,45 15,35 15,18	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 3-2 2-2 3-2 1-1
5435,83 5433,48 5432,60 5430,27 5429,69	1 1 1 10 20	13,30 13,33 13,33 13,33 { 12,91 13,17	15,58 15,61 15,61 15,61 15,19 15,45	$4p' [1^{1}/_{2}] - 9d [2^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 10d [1^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 10d [1^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 10d [1^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}] - 5d [1^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}] - 7d [3^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 1 - 1 \\ 2 - 3 \end{array} $
5427,39 5422,55 5421,3536 5417,22 5413,32	$\begin{array}{c} 1 \\ 2 \\ 500 \\ 10 \\ 10 \end{array}$	13,30 13,33 13,08 13,17 13,15	15,59 15,61 15,36 15,46 15,44	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 1-2 3-2 2-2 1-1
5410,4750 5409,34 5402,08 5399,01 5393,971	500 1 1 20 200	13,17 13,28 13,28 13,15 13,17	15,46 15,57 15,58 15,45 15,47	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-3 \\ 1-1 \\ 1-2 \\ 1-2 \\ 2-2 \end{array} $
5390,72 5389,10 5387,37 5386,79 5373,4951	40 40 40 1 500	13,17 13,17 13,33 13,27 13,15	15,47 15,47 15,63 15,57 15,46	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \end{array}$	2-1 2-1 1-2 0-1 1-2
5372 ,29 5369 ,97 5362 ,48 5356 ,49 5353 ,46	1 5 1 10 20	13,30 13,30 13,30 — 11,55	15,61 15,61 15,61 — 13,86	$\begin{array}{c} 4p' \left[1^{1}/_{2}\right] - 10d \left[\frac{1}{2}\right]^{\circ} \\ 4p' \left[1^{1}/_{2}\right] - 10d \left[1^{1}/_{2}\right]^{\circ} \\ 4p' \left[\frac{1}{2}\right] - 10d \left[3^{1}/_{2}\right]^{\circ} \\ - \\ 4s \left[1^{1}/_{2}\right]^{\circ} - 3d \left[\frac{1}{2}\right]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-3 \\ -1 \end{array} $
5350,58 5347,412 5345,81 5344,28 5341,78	20 200 20 5 10	13,15 13,15 13,15 13,33 13,33	15,47 15,47 15,47 15,65 15,65	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 9s' \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 9s' \ [1^{1}/_{2}]^{\circ} \end{array}$	1-2 1-1 1-1 1-0 1-1
5328,02 5327,07 5324,80 5317,726 5309,517	20 1 5 60 200	13,30 13,28 13,28 13,30 13,17	15,63 15,61 15,61 15,63 15,51	$\begin{array}{c} 4p' \; [1^{1}/_{2}] - 7d' \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 10d \; [1/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 10d \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 7d' \; [2^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 6d' \; [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 1-2 \\ 2-2 \\ 2-2 \end{array} $
5305,17 5296,91 5296,32 5290,00 5286,071	1 5 20 60	13,27 13,30 13,17 13,17 13,17	15,61 15,64 15,51 15,51 15,52	$\begin{array}{c} 4p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 11d \ [^{2}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6d' \ [^{2}/_{2}]^{\circ} \end{array}$	0-1 $2-3$ $2-2$ $2-1$ $2-3$
5283,43	20	$\begin{cases} 13,28 \\ 13,30 \end{cases}$	15,63 15,65	$4p' [1^{1}/_{2}] - 7d' [2^{1}/_{2}]^{\circ} 4p' [1^{1}/_{2}] - 9s' [1/_{2}]^{\circ}$	$\begin{array}{c} 1-2 \\ 2-1 \end{array}$
5280,40 5279,05 5267,48 5263,02	$\begin{array}{c} 60 \\ 20 \\ \frac{2}{2} \end{array}$	13,09 13,15 11,55	15,44 15,51 13,90	$\begin{array}{c} - \\ 4p \ [2^{1/2}] - 7d \ [^{1/2}] ^{\circ} \\ 4p \ [^{1/2}] - 6d' \ [^{1/2}] ^{\circ} \\ 4s \ [^{1/2}] ^{\circ} - 3d \ [^{1/2}] ^{\circ} \end{array}$	2-1 1-2 2-1
5254,4710 5252,7890 5249,20 5248,18 5246,76	60 300 40 1 5	13,15 13,09 13,17 13,15 13,17	15,51 15,45 15,53 15,51 15,53	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-1 \\ 1-1 \\ 2-2 \end{array} $
5246,24 5242,13 38	40 2	13,17 13,28	15,53 15,65	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 1—0
30					

					_
λ, Λ	I	$E_{ m H}^{},~{ m eV}$	$E_{\rm B}$, eV	Transition	J
5241,091 5239,71 5236,21	60 2 20	13,09 13,28 13,17	15,46 15,65 15,54	$4p [2^{1}/_{2}] - 7d [2^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 9s' [^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}] - 10s [1^{1}/_{2}]^{\circ}$	2—2 1—0 2—2
5234,74 5229,86 5222,90 5221,2729 5219,30	5 40 20 500 40	13,09 13,17 13,08 13,08 13,09	15,46 15,54 15,45 15,45 15,47	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 7d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 8s' \; [^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 9s \; [1^{1}/_{2}]^{\circ} \end{array}$	2—3 2—1 3—2 3—4 2—2
5216,28 5214,774 5210,492 5208,04 5207,17	60 200 200 10 10	13,09 13,09 13,08 13,15 13,15	15,47 15,47 15,45 15,53 15,54	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 9s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 6d' \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 8s' \; [^{1}/_{2}]^{\circ} \end{array}$	2-1 2-1 3-3 1-1 1-1
5205,79 5198,96 5195,29 5194,77 5194,02	10 2 1 20 5	13,15 13,08 13,15 13,15 13,15	15,53 15,46 15,54 15,53 15,54	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 8s' \ [1/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 3-2 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
5192,72 5187,7507 5177,540 5162,2858 5159,69	60 800 40 500 10	13,08 12,91 13,08 12,91 13,17	15,46 15,30 15,47 15,31 15,57	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] \ - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \end{array}$	3-3 1-2 3-2 1-1 2-1
5153,11 5151,3943 5141,81 5134,17 5132,61	20 2 1	13,47 12,91 13,17 13,17 13,17	15,58 15,31 15,58 15,59 15,59	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 1-0 \\ 2-3 \\ 2-2 \\ 2-1 \end{array} $
5127,802 5124,72 5121,88 5120,01 5118,2057	60 1 5 1 60	13,09 13,15 13,09 13,15 13,09	15,51 15,57 15,51 15,57 15,52	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \end{array}$	2-2 1-0 2-1 1-1 2-3
5113,50 5104,74 5099,64 5098,97 5094,84	$\begin{array}{c} 1 \\ 20 \\ 5 \\ 20 \\ 1 \end{array}$	13,15 13,15 13,08 11,55 13,15	15,58 15,58 15,51 13,98 15,59	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 3d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 3-2 \\ 2-4 \\ 1-2 \end{array} $
5093,32 5087,085 5084,79 5082,74 5081,44	10 60 1 20 10	13,15 13,09 13,17 13,09 13,09	15,59 15,53 15,61 15,54 15,53	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	11 23 21 21 22
5078,03 5076,03 5073,0758 5071,30 5070,99	40 1 200 5 40	13,08 13,17 12,91 13,09 { 13,09 13,09	15,52 15,61 15,35 15,54 15,53 15,54	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 6d' \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 10d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-3 \\ 2-3 \\ 1-1 \\ 2-2 \\ 2-1 \\ 2-1 \end{array} $
5069,66 5068,39 5065,48 5063,99 5062,72	5 5 5 1	13,17 12,91 13,09 13,17 13,17	15,62 15,35 15,54 15,62 15,62	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] \ - 6d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 2 - 1 \\ 2 - 2 \\ 2 - 1 \end{array} $
5060,079: 5056,53 5054,178: 5048,813: 5047,30	300	13,08 12,91 12,91 12,91 13,08	15,52 15,36 15,36 15,36 15,53	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8s \ [4^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-4 \\ 1-0 \\ 1-1 \\ 1-2 \\ 3-3 \end{array} $

λ, Å	I	E_{H} , eV	EB, eV	Transition	J	
5047,00 5044,15 5041,23 5040,51 5035,88	1 2 10 10 5	13,15 13,15 13,08 12,91 13,17	15,61 15,61 15,53 15,35 15,63	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \end{array}$	1-0 1-2 3-3 1-1 2-3	
5034,25 5032,026 5029,64 5025,74 5024,50	10 60 5 1	13,15 13,08 11,55 13,15 13,08	15,61 15,54 14,01 15,62 15,59	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 3d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 3-2 \\ 2-3 \\ 1-2 \\ 1-1 \end{array} $	
5017,25 5013,47 5007,09 5006,84 5005,13	5 1 2 2 1	13,17 13,17 13,15 11,83 13,17	15,64 15,64 15,63 14,30 15,65	$\begin{array}{l} 4p \ [1^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 13s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 7d' \ [2^{1}/_{2}]^{\circ} \\ 4s' \ [1/_{2}]^{\circ} - 3d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 1 - 2 \\ 1 - 1 \\ 2 - 1 \end{array} $	
5004,318 4999,65 4991,66 4989,948 4985,09	20 1 1 80 10	13,09 13,15 13,09 13,09	15,57 15,63 15,58 15,58	$\begin{array}{c} - \\ 4p \ [2^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 11d \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \end{array}$	2-1 1-0 2-3 2-2	
4982,81 4979,05 4975,66 4974,18 4973,53	1 1 2 10 5	13,09 13,17 13,09 13,09	15,58 15,66 15,59 15,59 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 2-3 2-2 2-1	
4969,88 4956,750 4955,21 4951,75 4949,64	1 100 2 10 1	13,15 13,08 13,08 13,08 13,17	15,65 15,58 15,58 15,58 15,68	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 9s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 9d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 13d \ [2^{1}/_{2}]^{\circ} \end{array}$	1-0 3-4 3-2 3-3 2-3	
4944,80 4937,718 4929,16 4921,042 4917,85	5 30 2 80 5	13,08 13,08 13,09 13,09 13,09	15,58 15,59 15,61 15,61 15,61	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 9d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 11s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 10d \; [1/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 10d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 10d \; [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-3 \\ 3-2 \\ 2-1 \\ 3-3 \\ 2-2 \end{array} $	
4915,03 4909,71 4908,52 4901,26 4894,6909	$\begin{array}{c} 1 \\ 2 \\ 10 \\ 2 \\ 150 \end{array}$	13,09 13,09 13,09 11,62 12,91	15,62 15,62 15,62 14,15 15,44	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 10d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 12s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 12s \; [1^{1}/_{2}]^{\circ} \\ 4s \; [1^{1}/_{2}]^{\circ} - 3d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 7d \; [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 2 - 1 \\ 1 - 1 \\ 1 - 0 \end{array} $	
4890 ,19 4887 ,9478 4886 ,29 4883 ,86 4883 ,27	1 200 30 5 30	13,08 12,91 13,08 13,08 13,09	15,61 15,44 15,61 15,61 15,63	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 10d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 7d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 10d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 10d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d' \; [2^{1}/_{2}]^{\circ} \end{array}$	3-2 1-1 3-4 3-3 2-3	
4877,96 4876,2619 4872,73 4867,84 4865,91	1 200 10 10 1	13,08 12,91 13,08 13,08 13,09	15,62 15,45 15,62 15,64 15,64	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 10d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [1/_{2}] - 7d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 12s \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 11d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 11d \; [2^{1}/_{2}]^{\circ} \end{array}$	3-3 1-2 3-2 3-3 2-3	
4862,16 4859,44 4855,37 4854,37 4846,73	1 5 1 1 5	13,09 11,55 12,91 13,09 13,08	15,64 14,10 15,46 15,65 15,63	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 13s \; [1^{1}/_{2}]^{\circ} \\ 4s \; [1^{1}/_{2}]^{\circ} - 3d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 7d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 9s' \; [1^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 7d' \; [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-2 \\ 2-1 \\ 3-3 \end{array} $	
4836,697 4835,97 4834,10	150 30 30	12,91 13,08 12,91	15,47 15,64 15,47	$\begin{array}{c} 4p \ [^{1}/_{2}] - 9s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}1/_{2}] - 11d \ [^{3}1/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 9s \ [^{1}1/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 1-2 \\ 3-3 \\ 1-1 \end{array} $	

λ, Å	I	E _{II} , eV	E _B , eV	Transition	J
4832,79 4832,38	5 5	12,91 13,09	15,47 15,66	$4p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} $ $4p \ [^{2}1/_{2}] - 12d \ [^{3}1/_{2}]^{\circ}$	1—1 2—3
4830,54 4829,47 4825,97 4804,33 4798,742	$\begin{array}{c} 1 \\ 2 \\ 2 \\ 5 \\ 30 \end{array}$	13,08 13,08 13,08 13,09 13,08	15,64 15,64 15,64 15,67 15,66	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 11d \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 13s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 13d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 12d \ [3^{1}/_{2}]^{\circ} \end{array}$	3—2 3—3 3—2 2—3 3—4
4796,57 4794,10 4791,15 4770,34 4768,6750	$\begin{array}{c} 1 \\ 1 \\ 2 \\ 2 \\ 150 \end{array}$	13,08 13,08 13,08 13,08 12,91	15,66 15,66 15,66 15,67 15,51	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 12d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 12d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 14s \ [1^{1}/_{2}]^{\circ} \\ 4p \ [2^{1}/_{2}] - 13d \ [3^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \end{array}$	3—3 3—3 3—2 3—4 1—2
4752,9404 4748,23 4746,823 4730,66 4727,48	150 5 80 5 5	12,91 13,08 12,91 —	15,51 15,69 15,52 —	$\begin{array}{c} 4p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}/_{2}] - 14d \ [^{3}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ - \\ - \end{array}$	1-1 3-4 1-0 -
4724,10 4719,94 4719,22 4718,10 4709,50	5 20 2 2 30	12,91 12,91 12,91 12,91	 15,53 15,54 15,53 15,54	$\begin{array}{c} - \\ 4p \ [^{1}/_{2}] - 6d' \ [1^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} -\\ 1-1\\ 1-1\\ 1-2\\ 1-2 \end{array} $
4709,08 4708,46 4704,35 4702,3155 4651,388	$10 \\ 2 \\ 2 \\ 1200 \\ 20$	12,91 12,91 12,91 11,83 12,91	15,53 15,54 15,54 14,46 15,57	$\begin{array}{c} 4p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 8s' \ [^{1}/_{2}]^{\circ} \\ 4s' \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] \\ 4p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \end{array}$	1-1 1-0 1-1 1-1 1-0
4647,493 4642,148 4628,4409 4626,78 4625,46	40 80 1000 30 10	12,91 12,91 11,83 12,91 12,91	15,57 15,58 14,51 15,59 15,59	$\begin{array}{c} 4p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 4s' \ [^{1}/_{2}] ^{\circ} - 5p \ [^{2}/_{2}] \\ 4p \ [^{1}/_{2}] - 11s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 11s \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 2 \\ 1 - 2 \\ 1 - 1 \end{array} $
4596,0964 4589,288 4587,21 4586,610 4584,958	1000 80 5 10 10	11,83 11,83 12,91 12,91 12,91	14,52 14,53 15,61 15,61 15,63	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 5p \ [4^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 5p \ [4^{1}/_{2}] \\ 4p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 7d' \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 1 - 1 \\ 1 - 2 \end{array} $
4569,69 4568,64 4564,82 4554,319 4544,746	$\begin{array}{c} 2 \\ 2 \\ 4 \\ 45 \\ 30 \end{array}$	12,91 12,91 — 12,91	15,62 15,62 — 15,63	$4p \ [^{1}/_{2}] - 12s \ [^{1}/_{2}]^{\circ} \ 4p \ [^{1}/_{2}] - 12s \ [^{1}/_{2}]^{\circ} \ - 4p \ [^{1}/_{2}] - 7d' \ [^{2}/_{2}]^{\circ} \ - 6p \ [^{1}/_{2}]^{\circ} \ - 6p \ [^{1}/$	$ \begin{array}{c} 1-2 \\ 1-1 \\ - \\ 1-2 \\ - \\ \end{array} $
4541,60 4534,78 4523,35 4522,3238 4510,7335	20 20 1 800 1000	12,91 12,91 11,72 11,83	15,63 15,65 14,46 14,58	$4p \ [^{1}/_{2}]-11d \ [^{1}/_{2}]^{\circ} - \ 4p \ [^{1}/_{2}]-9s' \ [^{1}/_{2}]^{\circ} \ 4s' \ [^{1}/_{2}]^{\circ}-5p \ [^{1}/_{2}] \ 4s' \ [^{1}/_{2}]^{\circ}-5p \ [^{1}/_{2}]$	1-0 - 1-0 0-1 1-0
4509 ,87 4507 ,45 4505 ,16 4480 ,87 4479 ,31	4 1 3 5 5	12,91 	15,66 	4p [1/2]—12d [1/2]° ————————————————————————————————————	1-0
4474,72 4461,46 4460,53 4456,61 4448,88	5 5 10 3 3	 	_ _ _ _	_ _ _ 	

				•	
λ, Å	I	$E_{\mathrm{H}},\;\mathrm{eV}$	E _B , eV	Transition	J
4445,84 4423,996 4368,36 4367,87	5 80 5 10	12,91 11,72 —	15,70 14,52 —	$4p \ [^{1}/_{2}] - 8d' \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] = 0$	1-2 0-1 -
4363,7957	80	11,62	14,46	$4s [1^{1}/_{2}]^{\circ} - 5p [1/_{2}]$	1—1
4345,167 4335,3381 4333,5612 4310,47 4300,1011	1000 800 1000 20 1200	11,83 11,83 11,83 — 11,62	14,66 14,69 14,69 — 14,51	$\begin{array}{c} 4s' \ [^{1}/_{2}\]^{\circ} -5p' \ [1^{1}/_{2}\] \\ 4s' \ [^{1}/_{2}\]^{\circ} -5p' \ [^{1}/_{2}\] \\ 4s' \ [^{1}/_{2}\]^{\circ} -5p' \ [^{1}/_{2}\] \\ - \\ 4s \ [^{1}/_{2}\]^{\circ} -5p \ [^{2^{1}/_{2}}\] \end{array}$	$ \begin{array}{c} 1 - 1 \\ 1 - 1 \\ 1 - 2 \\ - \\ 1 - 2 \end{array} $
4299,24 4294,97 4289,09 4272,1690 4271,24	5 20 5 1200 5	11,62	- - 14,52	$ \begin{array}{c} -\\ -\\ -\\ 4s \left[1^{1}/_{2}\right]^{\circ} -5p \left[1^{1}/_{2}\right] \end{array} $	 11
4266,2868	1200	11,62	 14,53	$-4s \left[1^{1}/_{2}\right]^{c} -5p \left[1^{1}/_{2}\right]$	— 1—2
4265,52 4259,3617 4258,59 4254,95	2 1200 5 10	11,83	14,74	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 -
4251,1850 4250,41 4249,37 4243,57	$ \begin{array}{r} 800 \\ 3 \\ 20 \\ 20 \end{array} $	11,55 — — —	14,46 	4s [1 ¹ / ₂]°—5p [¹ / ₂] — —	2—1 — — —
4200,6746	1200	11,55	14,50	$4s [1^{1}/_{2}]^{\circ} - 5p [2^{1}/_{2}]$	2-3
4198,3176 4191,0288 4190,7138 4181,8837 4176,33	1200 1200 600 1000 20	11,62 11,72 11,55 11,72	14,58 14,66 14,51 14,69	$\begin{array}{c} 4s \left[1^{1}/_{2}\right]^{\circ} - 5p \left[1^{1}/_{2}\right] \\ 4s' \left[1^{1}/_{2}\right]^{\circ} - 5p' \cdot \left[1^{1}/_{2}\right] \\ 4s \left[1^{1}/_{2}\right]^{\circ} - 5p \left[2^{1}/_{2}\right] \\ 4s' \left[1^{1}/_{2}\right]^{\circ} - 5p' \left[1^{1}/_{2}\right] \\ - \end{array}$	1-0 0-1 2-2 0-1
4175,40 4168,70 4168,41 4164,1795 4158,5906	10 3 3 1000 1200	 11,55 11,55	 14,52 14,53	$-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$	
4152,54 4054,5253 4045,9658 4044,4185 4032,97	20 80 150 1200 20	11,62 11,62 11,62 11,83	14,66 14,69 14,69 14,90	$-\frac{4s \left[1^{1}/_{2}\right]^{\circ}-5p' \left[1^{1}/_{2}\right]}{4s \left[1^{1}/_{2}\right]^{\circ}-5p' \left[1^{1}/_{2}\right]}$ $4s \left[1^{1}/_{2}\right]^{\circ}-5p' \left[1^{1}/_{2}\right]$ $4s' \left[1^{1}/_{2}\right]^{\circ}-4f \left[1^{1}/_{2}\right]$	1-1 1-1 1-2 1-1, 2
3979,7149 3948,9785 3947,5048 3899,878 3894,6603	10 2000 1000 100 300	11,62 11,85 11,55 11,72 11,83	14,74 14,69 14,69 14,90 15,01	$\begin{array}{c} 4s \left[\frac{1}{2} \right]^{\circ} - 5p' \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 5p' \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 5p' \left[\frac{1}{2} \right] \\ 4s' \left[\frac{1}{2} \right]^{\circ} - 4f \left[\frac{1}{2} \right] \\ 4s' \left[\frac{1}{2} \right]^{\circ} - 6p \left[\frac{1}{2} \right] \end{array}$	1-0 2-1 2-2 0-1 1-1
3876,080 3866,2752 3864,2669 3834,6788 3781,3570	10 5 10 800 300	11,83 11,83 11,83 11,83 11,62	15,03 15,03 15,03 15,06 14,90	$4s' [1/2]^{\circ} -6p [2^{1}/2]$ $4s' [1/2]^{\circ} -6p [1^{1}/2]$ $4s' [1/2]^{\circ} -6p [1^{1}/2]$ $4s' [1/2]^{\circ} -6p [1/2]$ $4s [1^{1}/2]^{\circ} -4f [1^{1}/2]$	1-2 1-1 1-2 1-0 1-1, 2
3775,4408 3770,3698 3743,7653 3696,5082 3690,8960	10 400 100 20 300	11,62 11,72 11,72 11,55 11,55	14,91 15,01 15,03 14,90 14,91	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 0-1 0-1 2-1, 2 2-3, 2
3675,2367 3674,05 3670,6693	300 2 300	11,83 11,83 11,83	15,20 15,20 15,20	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-1 1-2

λ, λ	I	E _H , eV	E _B , eV	Transition	J
3663,76 3659,5305	5 100	11,83 11,62	15,21 15,01	$4s' [1/2]^{\circ}$ — $5f [1^{1}/2]$ $4s [1^{1}/2]^{\circ}$ — $6p [1/2]$	1—1, 2 1—1
3649,8330 3643,1169 3634,4605 3632,6837 3606,5224	800 100 300 300 1000	11,83 11,62 11,62 11,62 11,62	15,22 15,03 15,03 15,03 15,06	$\begin{array}{c} 4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 6p' \begin{bmatrix} 1/_2 \end{bmatrix} \\ 4s \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} - 6p \begin{bmatrix} 2^{1}/_2 \end{bmatrix} \\ 4s \begin{bmatrix} 1^{1}/_2 \end{bmatrix}^{\circ} - 6p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} \\ 4s \begin{bmatrix} 1^{1}/_2 \end{bmatrix}^{\circ} - 6p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} \\ 4s \begin{bmatrix} 1^{1}/_2 \end{bmatrix}^{\circ} - 6p \begin{bmatrix} 1^{1}/_2 \end{bmatrix} \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \\ 1 - 0 \end{array} $
3599,7116 3593,418 3588,97 3588,11 3582,6971	$\frac{20}{2}$ $\frac{2}{3}$ $\frac{30}{30}$	11,83 11,83 11,83 11,83 11,62	15,27 15,28 15,28 15,28 15,08	$4s'$ $[1/2]^{\circ}$ — $7p$ $[1/2]$ $4s'$ $[1/2]^{\circ}$ — $7p$ $[2^{1}/2]$ $4s'$ $[1/2]^{\circ}$ — $7p$ $[1^{1}/2]$ $4s'$ $[1/2]^{\circ}$ — $7p$ $[1^{1}/2]$ $4s$ $[1^{1}/2]^{\circ}$ — $4f'$ $[2^{1}/2]$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \\ 1 - 2 \end{array} $
3572,2960 3567,6562	300 300	11,83 11,55 (11,55	15,30 15,02 15,03	$4s' [1/2]^{\circ} -7p [1/2]$ $4s [11/2]^{\circ} -6p [21/2]$ $4s [11/2]^{\circ} -6p [21/2]$	$ \begin{array}{c} 1 - 0 \\ 2 - 3 \\ 2 - 2 \end{array} $
3564,2955 3563,2864 3556,0076	100 100 100	11,72 11,72 11,72 11,55	15,20 15,20 15,03	$\begin{array}{c} 4s \left[\frac{1}{2} \right] - 6p \left[\frac{2}{2} \right] \\ 4s' \left[\frac{1}{2} \right] \circ - 6p' \left[\frac{1}{2} \right] \\ 4s' \left[\frac{1}{2} \right] \circ - 6p' \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right] \circ - 6p \left[\frac{1}{2} \right] \end{array}$	0-1 0-1 2-1
3554,3056 3553,58 3506,4807 3493,2747 3490,50	$ \begin{array}{r} 300 \\ 45 \\ 30 \\ 20 \\ 3 \end{array} $	11,55 11,72 11,55 11,72 11,83	15,03 15,21 15,08 15,27 15,38	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 4f' \ [2^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 7p \ [1/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \end{array}$	2—2 0—1 2—3, 2 0—1 1—1, 2
3483,17 3465,15 3464,08 3461,0785 3457,81	5 2 1 300 3	11,72 11,62 11,62 11,62 11,83	15,28 15,20 15,20 15,20 15,41	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \end{array}$	0-1 2-1 2-1 1-2 1-1
3454,944 3452,32 3449,52 3442,58	20 3 2 10	11,62 11,62 11,83 { 11,83 11,62	15,21 15,21 15,42 15,43 15,22	$4s \left[\frac{1}{2}\right]^{\circ} - 5f \left[\frac{1}{2}\right]$ $4s \left[\frac{1}{2}\right]^{\circ} - 5f \left[\frac{2}{2}\right]$ $4s' \left[\frac{1}{2}\right]^{\circ} - 8p \left[\frac{1}{2}\right]$ $4s' \left[\frac{1}{2}\right]^{\circ} - 8p \left[\frac{1}{2}\right]$ $4s \left[\frac{1}{2}\right]^{\circ} - 6p' \left[\frac{1}{2}\right]$	$ \begin{array}{r} 1-1, \ 2 \\ 1-2 \\ 1-0 \\ 1-0 \end{array} $
3418,51 3417,68 3416,80 3406,1804 3397,920 3393,7522	3 5 30 20 250	11,83 11,83 11,83 11,83 11,62 11,83 11,55	15,45 15,45 15,45 15,47 15,27 15,48 15,20	$4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 7p' \begin{bmatrix} 11/_2 \end{bmatrix}$ $4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 7p' \begin{bmatrix} 1/_2 \end{bmatrix}$ $4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 7p' \begin{bmatrix} 11/_2 \end{bmatrix}$ $4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 7p' \begin{bmatrix} 1/_2 \end{bmatrix}$ $4s \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} - 7p \begin{bmatrix} 1/_2 \end{bmatrix}$ $4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 7f \begin{bmatrix} 11/_2 \end{bmatrix}$ $4s \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} - 6p' \begin{bmatrix} 11/_2 \end{bmatrix}$	1-1 1-1 1-2 1-0 1-1 1-1, 2 2-1
3392,7812 3392,31 3390,29 3389,854 3388,365	100 3 3 20 20	11,55 11,62 11,72 11,55 11,62	15,20 15,28 15,38 15,20 15,28	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ}-7p \ [2^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ}-6f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ}-7p \ [1^{1}/_{2}] \end{array}$	2-1 1-2 0-1 2-2 1-1
3387,600 3383,98 3381,49 3373,4823 3372,88	20 2 20 300 3	11,62 11,55 11,55 11,62 11,83	15,28 15,21 15,21 15,30 15,50	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3368 ,84 3363 ,47 3359 ,48 3352 ,20 3333 ,84	1 20 10 1 2	11,83 11,83 11,72 11,72 11,83	15,51 15,51 15,41 15,42 15,54	$4s' [1/2]^{\circ} - 9p [11/2]$ $4s' [1/2]^{\circ} - 9p [1/2]$ $4s' [1/2]^{\circ} - 8p [1/2]$ $4s' [1/2]^{\circ} - 8p [11/2]$ $4s' [1/2]^{\circ} - 8f [11/2]$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 0-1 \\ 0-1 \\ 1-1, 2 \end{array} $
3325,5006 3323,825 3322,44	$\frac{100}{30}$	11,55 11,55 11,72	15,27 15,28 15,45	$4s [1^{1}/_{2}]^{\circ} -7p [2^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ} -7p [2^{1}/_{2}]$ $4s' [1/_{2}]^{\circ} -7p' [1^{1}/_{2}]$	2-3 2-2 0-1

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λ, Å	I	$E_{ m H}^{}$, eV	$E_{ m B}^{},$ eV	Transition	J
3321,58 3320,67	$\frac{5}{2}$	11,72 11,83	$15,45 \\ 15,56$	$\frac{4s'}{4s'} \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-7p' \begin{bmatrix} 1/2 \end{bmatrix}$ $\frac{4s'}{12}$ ° $-10p \begin{bmatrix} 1/2 \end{bmatrix}$	0-1 1-1
3320,06 3319,3446 3317,54 3314,49 3310,47	$\begin{array}{c} 3 \\ 300 \\ 1 \\ 2 \\ 3 \end{array}$	11,55 11,55 11,83 11,83	15,28 15,28 15,56 15,57	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 10p \ [1^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 10p \ [1^{1}/_{2}] \\ - \end{array}$	2—1 2—2 1—2 1—0 —
3300,39 3299,26 3299,02 3289,95 3289,39	20 2 4 3 3	11,62 11,62 11,72 11,62 11,83	15,38 15,38 15,48 15,39 15,60	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 8p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1-1, 2 \\ 1-2 \\ 0-1 \\ 1-2 \\ 1-2 \end{array} $
3285,10 3283,74 3282,70 3279,25 3278,93	2 1 1 3 3	11,83 11,83 11,83 11,72 11,83	15,60 15,60 15,60 15,50 15,61	$4s' [1/2]^{\circ} - 8p' [1/2]$ $4s' [1/2]^{\circ} - 11p [1/2]$ $4s' [1/2]^{\circ} - 11p [1^{1}/2]$ $4s' [1/2]^{\circ} - 9p [1/2]$ $4s' [1/2]^{\circ} - 11p [1/2]$	1-0 1-1 1-2 0-1 1-0
3275,72 3271,16 3266,34 3264,29 3263,78	$\begin{array}{c} 2 \\ 10 \\ 1 \\ 3 \\ 3 \end{array}$	11,72 11,62 11,62 11,62 11,62	15,51 15,41 15,42 15,42 15,42	$4s' [1/2]^{\circ} - 9p [1^{1}/2]$ $4s [1^{1}/2]^{\circ} - 8p [1/2]$ $4s [1^{1}/2]^{\circ} - 8p [2^{1}/2]$ $4s [1^{1}/2]^{\circ} - 8p [1^{1}/2]$ $4s [1^{1}/2]^{\circ} - 8p [1^{1}/2]$	0-1 $1-1$ $1-2$ $1-1$ $1-2$
3257,585 3256,20 3242,40 3238,49 3235,57	100 2 2 1 2	11,62 11,83 11,72 11,83 11,55	15,43 15,63 15,54 15,65 15,38	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 12p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 8f \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 13p \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1 - 0 \\ 1 - 0 \\ 0 - 1, 2 \\ 1 - 0 \\ 2 - 1, 2 \end{array} $
3234,491 3229,91 3225,58 3213,84 3212,99	3 20 2 2	{ 11,62 11,55 11,72 11,55 11,62 11,62	15,45 15,38 15,56 15,39 15,48 15,48	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 10p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 5f' \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1-2 \\ 2-2 \\ 0-1 \\ 2-3, 2 \\ 1-1, 2 \\ 1-2 \end{array} $
3211,99 3207,50 3203,66 3202,85 3201,12	2 10 10 5 3	11,83 11,55 11,55 11,55 11,72	15,61 15,41 15,42 15,42 15,59	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 9p' \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 8p \ [^{2}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 8p \ [^{2}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 8p' \ [^{1}/_{2}] \end{array}$	1-0 2-1 2-3 2-2 0-1
3200,84 3200,39 3195,12 3194,93 3191,72	$ \begin{array}{c} 2 \\ 100 \\ 5 \\ 1 \\ 2 \end{array} $	11,55 11,55 11,62 11,72 11,62	15,42 15,42 15,50 15,60 15,51	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 4s' \ [1^{1}/_{2}]^{\circ} - 11p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \end{array}$	2-1 2-2 1-1 0-1 1-1
3191,50 3186,63 3173,71 3172,961 3172,18	$\begin{array}{c} 2 \\ 5 \\ 2 \\ 150 \\ 5 \end{array}$	11,62 11,62 11,55 11,55 11,55	15,51 15,51 15,45 15,45 15,45	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p' \ [^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 2-1 \\ 2-1 \\ 2-2 \end{array} $
3160,06 3159,55 3152,29 3151,52 3150,42	5 1 3 3 1	11,62 11,62 11,55 11,55 11,62	15,54 15,55 15,48 15,48 15,56	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 8f \ [1^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 6f' \ [2^{1}/_{2}] \end{array}$	1-1, 2 1-2 2-1, 2 2-3, 2 1-2
3148,20 3145,63 3145,42 3142,60 3134,27	1 1 1 3 2	11,62 11,62 11,62 11,62 11,55	15,56 15,56 15,56 15,57 15,50	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 10p \ [^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 10p \ [4^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 10p \ [4^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 10p \ [^{1}/_{2}] \\ 4s \ [4^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 2 - 1 \end{array} $
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
3132,87 3132,31 3131,04 3130,80 3120,06	$\begin{array}{c} 3 \\ 2 \\ 2 \\ 20 \\ 3 \end{array}$	11,55 11,55 11,55 11,55 11,62	15,50 15,50 15,51 15,51 15,60	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 8p' \ [1^{1}/_{2}] \end{array}$	2—3 2—2 2—1 2—2 1—2
3117,85 3116,63 3116,22 3114,96 3114,10	3 1 1 1			$\begin{array}{c} -\\ -\\ -\\ 4s \left[1^{1}/_{2}\right]^{\circ} -8p' \left[^{1}/_{2}\right]\\ 4s \left[1^{1}/_{2}\right]^{\circ} -11p \left[1^{1}/_{2}\right]\\ 4s \left[1^{1}/_{2}\right]^{\circ} -11p \left[1^{1}/_{2}\right] \end{array}$	$ \begin{array}{c} -\\ 1-0\\ 1-1\\ 1-2, 1 \end{array} $
3110,66 3100,09 3092,97 3091,32 3090,18	3 5 1 2 1	11,62 11,55 11,62 11,55 11,62	15,61 15,55 15,63 15,56 15,63	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 11p \ [^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 12p \ [^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 6f' \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 12p \ [^{1}/_{2}] \end{array}$	1-0 2-3, 2 1-1 2-3 1-0
3089,17 3087,81 3087,31 3086,47 3074,15 3065,73	2 1 1 2 1	11,55 11,55 11,55 11,55 11,62	15,56 15,56 15,56 15,56 15,65	$\begin{array}{c} 4s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{2^{1}}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{2^{1}}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{1}{2} \right] \\ 4s \left[\frac{1}{2} \right]^{\circ} - 13p \left[\frac{1}{2} \right] \end{array}$	2-1 2-3 2-2 2-1 1-0
3063,44 3062,82 3062,06 3056,28	1 5 1 3 3	11,55 11,55 11,55 11,55 11,55	15,59 15,59 15,59 15,60 15,60	$\begin{array}{l} 4s \left[1^{1}/_{2} \right]^{\circ} - 9f \left[2^{1}/_{2} \right] \\ 4s \left[1^{1}/_{2} \right]^{\circ} - 8p' \left[1^{1}/_{2} \right] \\ 4s \left[1^{1}/_{2} \right]^{\circ} - 8p' \left[1^{1}/_{2} \right] \\ 4s \left[1^{1}/_{2} \right]^{\circ} - 8p' \left[1^{1}/_{2} \right] \\ 4s \left[1^{1}/_{2} \right]^{\circ} - 11p \left[1^{1}/_{2} \right] \end{array}$	2-3 2-1 2-1 2-2 2-2
1066,660 1048,218 894,310 879,949 876,063	15 25 4 3 4	0,00 0,00 0,00 0,00 0,00	11,62 11,83 13,86 14,09 14,15	$3p^{6} {}^{1}S - 4s [1^{1}/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 4s' [1/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 3d [1/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 5s [1^{1}/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 3d [1^{1}/_{2}]^{\circ}$	0-1 0-1 0-1 0-1 0-1
869,754 866,805 842,808 835,003 834,397	2 4 2 6 6	0,00 0,00 0,00 0,00 0,00	14,25 14,30 14,71 14,85 14,86	$\begin{array}{c} 3p^{6} {}^{1}S - 5s' \left[{}^{1}/_{2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 3d' \left[{}^{1}/_{2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 6s \left[{}^{1}/_{2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 4d \left[{}^{1}/_{2} \right]^{\circ} \end{array}$	0-1 0-1 0-1 0-1 0-1
826,371 825,348 820,129 816,466 816,233	$\frac{2}{1}$ $\frac{4}{4}$	0,00 0,00 0,00 0,00 0,00	15,00 15,02 15,12 15,18 15,19	$3p^{6} {}^{1}S - 4d' [1^{1}/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 6s' [1/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 5d [1/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 7s [1^{1}/_{2}]^{\circ}$ $3p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ}$	0-1 0-1 0-1 0-1
809,933 807,702 807,220 806,875 801,359	2 2 2 2 1	0,00 0,00 0,00 0,00 0,00	15,31 15,35 15,36 15,37 15,47	$\begin{array}{c} 3p^{6} {}^{1}S - 6d \left[\right]^{\circ} \\ 3p^{6} {}^{1}S - 6d \left[\right]^{1/2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 7s' \left[\right]^{\circ} \\ 3p^{6} {}^{1}S - 8s \left[\right]^{1/2} \right]^{\circ} \\ 3p^{6} {}^{1}S - 7d \left[\right]^{1/2} \right]^{\circ} \end{array}$	0—1 0—1 0—1 0—1 0—1
799 ,137 797 ,744	0 1	00,00 00,0	15,51 15,54	$3p^{6} {}^{1}S - 8d {}^{[1/_{2}]}^{\circ} 3p^{6} {}^{1}S - 8d' {}^{[1/_{2}]}^{\circ}$	0—1 0—1

Ar II, ground state $1s^2 2s^2 2p^6 3s^2 3p^{5/2}P_{3/2}^0$ Ionization potential 222 848,2 cm⁻¹; 27,628 eV

λ, Δ	I	$E_{ m H}$, eV	$E_{_{ m B}},\;{ m eV}$	Transition	J
11253,496	1	22,70	23,80	5s ² P-4p" ² P°	$\frac{3}{2}$ $\frac{3}$
11173,266	2	22,59	23,70	5s ⁴ P-5p ⁴ S°	

λ., Å	I	$E_{ m H}$, eV	$E_{\rm B}$, eV	Transition	J
11068,44 11067,929 10982,382	1 2 2	23,57 23,26 24,82	24,69 24,38 25,95	5p 4D°—6s 4P 4d 2F—(3P ₀)4f [3]° 4d′ 2F—(1D)4f [4]°	$\frac{3}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{7}{2}$ $\frac{5}{2} - \frac{7}{2}$
10974,33 10973,80 10954,260 10923,438 10916,67	1 2 2 7 1	24,81 23,08 23,08 18,73 23,51	25,94 24,21 24,21 19,87 24,65	$\begin{array}{c} 4d' {}^{2}F - (^{1}D)4f [3]^{\circ} \\ 4d {}^{4}P - (^{3}P_{2})4f [1]^{\circ} \\ 4d {}^{4}P - (^{3}P_{2})4f [1]^{\circ} \\ 3d {}^{2}D - 4p {}^{2}P^{\circ} \\ 5p {}^{4}D^{\circ} - 6s {}^{4}P \end{array}$	7/2 - 7/2 $1/2 - 1/2$ $1/2 - 3/2$ $5/2 - 3/2$ $5/2 - 5/2$
10869,698 10867,87 10867,343 10829,452 10817,858	2 4 3 3 1	23,01 23,17 24,81 18,66 24,76	24,15 24,31 25,95 19,80 25,90	$\begin{array}{c} 4d\ ^4F - (^3P_2)4f\ [4]^\circ \\ 4d'\ ^4P - (^3P_1)4f\ [2]^\circ \\ 4d'\ ^2F - (^1D)4f\ [4]^\circ \\ 3d\ ^2D - 4p\ ^2P^\circ \\ 4d'\ ^2D - (^1D)4f\ [2]^\circ \end{array}$	7/2 - 7/2 $5/2 - 5/2$ $7/2 - 9/2$ $3/2 - 1/2$ $5/2 - 5/2$
10812,901 10785,13 10764,378 10720,530 10683,050	12 1 8 1 12	18,62 24,79 23,16 18,45 18,33	19,76 25,94 24,31 19,61 19,49	3d ² F-4p ² D° 4d' ² D-(¹ D)4f [3]° 4d ² F-(³ P ₁)4f [4]° 4s' ² D-4p ⁴ D° 3d ⁴ P-4p ⁴ D°	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
10660,99 10639,86 10638,121 10619,458 10614,01	2 1 8 7 1	23,65 24,74 23,48 23,17 23,57	24,81 25,90 24,65 24,34 24,74	5p ⁴ D°-6s ⁴ P 4d' ² P-(¹ D)4f [2]° 5p ⁴ D°-6s ⁴ P 4d ⁴ P-(³ P)4f [3]° 5p ⁴ D°-4d' ² P	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 7/_{2} - 5/_{2} \\ 5/_{2} - 7/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
10580,83 10555,90 10541,552 10535,52 10519,510	2 1 5 2 9	23,62 23,62 23,51 23,16 23,01	24,79 24,79 24,69 24,34 24,19	$5p ^2D^{\circ}$ — $5d ^4D$ $5p ^2D^{\circ}$ — $4d' ^2D$ $5p ^4D^{\circ}$ — $6s ^4P$ $4d ^2F$ — $(^3P_1)4f [3]^{\circ}$ $4d ^4F$ — $(^3P_2)4f [5]^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \\ 7/2 - 9/2 \end{array} $
10500,212 10495,941 10467,173 10447,771 10442,57	6 2 20 2 1	23,62 23,62 18,49 24,76 23,57	24,80 24,80 19,68 25,94 24,76	$5p ^2D^{\circ} - 6s ^2P$ $5p ^2P^{\circ} - 6s ^2P$ $3d ^2F - 4p ^2D^{\circ}$ $4d' ^2D - (^1D)4f [3]^{\circ}$ $5p ^4D^{\circ} - 4d' ^2D$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array}$
10440,511 10410,53 10401,510 10392,604 10383,900	6 2 1 5 1	22,51 23,62 23,68 23,42 23,62	23,70 24,81 24,87 24,31 24,81	$\begin{array}{c} 5s^{4}P - 5p^{4}S^{\circ} \\ 5p^{2}P^{\circ} - 6s^{4}P \\ 5p^{2}D^{\circ} - 6s^{2}P \\ 4d^{4}P - (^{3}P_{1})^{4}f[2]^{\circ} \\ 5p^{2}D^{\circ} - 4d'^{2}F \end{array}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array}$
10325,34 10305,616 10299,077 10273,689 10268,320	1 1 5 5 2	18,06 23,48 22,95 23,17 25,19	19,26 24,69 24,15 24,38 26,40	$3d^{2}P-4p^{4}P^{\circ}$ $5p^{4}P^{\circ}-6s^{4}P$ $4d^{4}F-(^{3}P_{2})4f^{4}[4]^{\circ}$ $4d^{4}P-(^{3}P_{0})4f^{3}[3]^{\circ}$ $5p'^{2}F^{\circ}-6s'^{2}D$	3/2 - 3/2 $1/2 - 3/2$ $9/2 - 9/2$ $5/2 - 7/2$ $7/2 - 5/2$
10230,845 10220,980 10203,917 10138,408 10111,595	4 1 5 1 8	23,44 25,19 18,33 23,70 20,27	24,65 26,40 19,55 24,92 21,50	$5p ^4P^{\circ} - 6s ^4P$ $5p' ^2F^{\circ} - 6s' ^2D$ $3d ^4P - 4p ^4D^{\circ}$ $5p ^4S^{\circ} - 5d ^4P$ $3d' ^2F - 4p' ^2D^{\circ}$	3/2 - 5/2 $ 5/2 - 3/2 $ $ 5/2 - 5/2 $ $ 3/2 - 1/2 $ $ 7/2 - 5/2$
10110,660 10093,016 10022,278 9993,874 9989,02	3 1 4 4 1	18,45 23,08 23,10 24,21 21,35	19,68 24,31 24,34 25,45 22,59	$\begin{array}{c} 4s' \ ^2I) - 4p \ ^2D^{\circ} \\ 4d \ ^4P - (^3P_1)4f \ [2]^{\circ} \\ 4d \ ^4F - (^3P_1)4f \ [3]^{\circ} \\ (^3P_2)4f \ [1]^{\circ} - (^3P_2)5g \ [2] \\ 4p' \ ^2P^{\circ} - 5s \ ^4P \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
9988,39 9977,825 9972,313 9967,045 9965,41	1 3 1 12 1	23,48 24,21 23,51 22,95 24,34	24,73 25,45 24,76 24,19 25,58	$\begin{array}{c} 5p\ ^4P^{\circ}-4d'\ ^2P\\ (^3P_2)4f\ [1]^{\circ}-(^3P_2)5g\ [2]\\ 5p\ ^4D^{\circ}-4d'\ ^2D\\ 4d\ ^4F-(^3P_2)4f\ [5]^{\circ}\\ (^3P_1)4f\ [3]^{\circ}-(^3P_1)5g\ [3] \end{array}$	$\begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 9/2 - 11/2 \\ 7/2 - 7/2 \end{array}$
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λ, Å	I	$E_{\Pi}^{}$, eV	E _B , eV	Transition	J
9962,314 9952,809 9951,087 9949,151 9935,046	1 5 4 7 1	22,95 23,07 23,40 20,24 22,26	24,19 24,31 24,65 21,49 23,51	$\begin{array}{c} 4d\ ^{4}F-(^{3}P_{2})4f\ [5]^{\circ} \\ 4d\ ^{4}F-(^{3}P_{1})4f\ [4]^{\circ} \\ 5p\ ^{4}P^{\circ}-6s\ ^{4}P \\ 3d'\ ^{2}F-4p'\ ^{2}D^{\circ} \\ 3d''\ ^{2}D-5p\ ^{4}D^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9931,680 9928,830 9916,144 9914,246 9909,712	1 1 4 2 2	25,94 25,94 24,34 24,19 24,19	27,20 27,20 25,59 25,44 25,44	$(^{1}D)4f$ [3]°— $(^{1}D)5g$ [4] $(^{1}D)4f$ [3]°— $(^{1}D)5g$ [4] $(^{3}P_{1})4f$ [3]°— $(^{3}P_{1})5g$ [4] $(^{3}P_{2})4f$ [5]°— $(^{3}P_{2})5g$ [5] $(^{3}P_{2})4f$ [5]°— $(^{3}P_{2})5g$ [5]	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \\ 9/2 - 9/2 \\ 11/2 - 11/2 \end{array} $
9906,394 9905,880 9904,29 9854,065 9849,460	5 5 1 8 10	18,62 24,34 20,24 24,19 24,19	19,87 25,59 21,50 25,45 25,45	$\begin{array}{c} 3d\ ^{2}F-4p\ ^{2}P^{\circ} \\ (^{3}P_{1})4f\ [3]\ ^{\circ}-(^{3}P_{1})5g\ [4] \\ 3d'\ ^{2}F-4p'\ ^{2}D^{\circ} \\ (^{3}P_{2})4f\ [5]\ ^{\circ}-(^{3}P_{2})5g\ [6] \\ (^{3}P_{2})4f\ [5]\ ^{\circ}-(^{3}P_{2})5g\ [6] \end{array}$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 \\ 9/2 - 11/2 \\ 11/2 - 13/2 \end{array} $
9837,170 9829,856 9825,843 9824,642 9819,18	3 1 2 1	23,12 18,29 22,31 23,70 23,80	24,38 19,55 23,57 24,96 25,06	$\begin{array}{c} 4d\ ^4P - (^3P_0)4f\ [3]^\circ \\ 3d\ ^4P - 4p\ ^4D^\circ \\ 3d\ ''\ ^2D - 5p\ ^4D^\circ \\ 5p\ ^4S^\circ - 5d\ ^4P \\ 4p\ ''\ ^2P^\circ - 5d\ ^2F \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
9814 ,424 9803 ,697 9802 ,019 9793 ,239 9783 ,100	3 4 4 3 3	24,38 24,38 24,62 24,62 24,18	25,64 25,64 25,89 25,89 25,45	$ \begin{array}{c} (^{3}P_{0})4f [3]^{\circ} - (^{3}P_{0})5g [4] \\ (^{3}P_{0})4f [3]^{\circ} - (^{3}P_{0})5g [4] \\ 4d' \ ^{2}G - (^{1}D)4f [5]^{\circ} \\ 4d' \ ^{2}G - (^{1}D)4f [5]^{\circ} \\ (^{3}P_{2})4f [2]^{\circ} - (^{3}P_{2})5g [3] \end{array} $	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 9/2 - 11/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array} $
9773,575 9774,833 9761,847 9758,644 9756,157	4 2 1 4 3	24,31 23,07 23,07 24,31 24,31	25,58 24,34 24,34 25,58 25,58	$ \begin{array}{c} (^{3}P_{1})^{4}f \ [4]^{\circ} - (^{3}P_{1})5g \ [5] \\ 4d \ ^{4}F - (^{3}P_{1})4f \ [3]^{\circ} \\ 4d \ ^{4}F - (^{3}P_{1})4f \ [3]^{\circ} \\ (^{3}P_{1})^{4}f \ [4]^{\circ} - (^{3}P_{1})5g \ [5] \\ (^{3}P_{1})^{4}f \ [2]^{\circ} - (^{3}P_{1})5g \ [3] \end{array} $	7/2 - 9/2 $5/2 - 7/2$ $5/2 - 5/2$ $9/2 - 11/2$ $5/2 - 7/2$
9750,145 9743,460 9739,770 9734,554 9713,117	3 2 2 1 2	24,18 24,31 22,31 24,18 23,10	25,45 25,58 23,58 25,45 24,38	$ \begin{array}{c} (^3P_2)4f \ [2\]^{\circ} - (^3P_2)5g \ [3\] \\ (^3P_4)4f \ [2\]^{\circ} - (^3P_4)5g \ [3\] \\ 3d'' \ ^2D - 5p \ ^2P^{\circ} \\ (^3P_2)4f \ [2\]^{\circ} - (^3P_2)5g \ [2\] \\ 4d \ ^4F - (^3P_0)4f \ [3\]^{\circ} \end{array} $	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
9711,779 9701,961 9701,515 9678,812 9676,287	1 1 1 2 3	24,31 24,18 23,51 24,16 24,16	25,59 25,45 24,79 25,44 25,44	$ \begin{array}{l} (^3P_1)4f \ [4] \ ^{\circ}-(^3P_1)5g \ [4] \\ (^3P_2)4f \ [2] \ ^{\circ}-(^3P_2)5g \ [2] \\ 5p \ ^4D \ ^{\circ}-5d \ ^4D \\ (^3P_2)4f \ [3] \ ^{\circ}-(^3P_2)5g \ [5] \\ (^3P_2)4f \ [3] \ ^{\circ}-(^3P_2)5g \ [4] \end{array} $	$ \begin{array}{c} 9/2 - 9/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \\ 7/2 - 9/2 \end{array} $
9655,974 9643,312 9641,190 9623,235 9622,068	3 1 2 2 4	24,16 24,16 23,62 24,16 24,15	25,44 25,45 24,90 25,45 25,44	$(^{3}P_{2})^{4}f$ [3]°— $(^{3}P_{2})^{5}g$ [4] $(^{3}P_{2})^{4}f$ [3]°— $(^{3}P_{2})^{5}g$ [3] ^{5}p ^{2}D °— ^{5}d ^{4}F $(^{3}P_{2})^{4}f$ [3]°— $(^{3}P_{2})^{5}g$ [3] $(^{3}P_{2})^{4}f$ [4]°— $(^{3}P_{2})^{5}g$ [5]	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \end{array} $
9619,575 9612,508 9601,933 9599,325 9586,996	3 2 6 2 2	24,15 24,15 25,89 24,15 24,15 24,15	25,44 25,44 27,18 25,44 25,44 25,45	$(^{3}P_{2})4f$ [4] $^{\circ}$ — $(^{3}P_{2})5g$ [4] $(^{3}P_{2})4f$ [4] $^{\circ}$ — $(^{3}P_{2})5g$ [4] $(^{1}D)4f$ [5] $^{\circ}$ — $(^{1}D)5g$ [6] $(^{3}P_{2})4f$ [4] $^{\circ}$ — $(^{3}P_{2})5g$ [5] $(^{3}P_{2})4f$ [4] $^{\circ}$ — $(^{3}P_{2})5g$ [4] $(^{3}P_{2})4f$ [4] $^{\circ}$ — $(^{3}P_{2})5g$ [3]	$ \begin{array}{c} 7/2 - 9/2 \\ 7/2 - 7/2 \\ 9/2, 11/2 - 11/2, 13/2 \\ 9/2 - 11/2 \\ 9/2 - 9/2 \\ 7/2 - 7/2 \end{array} $
9553,631 9540,664 9535,640 9526,39 9508,440	5 5 3 1 3	23,48 23,01 23,51 23,01 22,26	24,78 24,31 24,81 24,31 23,57	$5p ^4D^{\circ} - 5d ^4D$ $4d ^4F - (^3P_1)4f [4]^{\circ}$ $5p ^4D^{\circ} - 4d' ^2F$ $4d ^4F - (^3P_1)4f [4]^{\circ}$ $3d'' ^2D - 5p ^4D^{\circ}$	7/2 - 7/2 7/2 - 9/2 5/2 - 7/2 7/2 - 7/2 5/2 - 3/2 7/ - 5/2
9480 ,871 9475 ,239 9436 ,22	1 4 1	23,48 18,45 23,48	24,79 19,76 24,80	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $ 347

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
9420 ,484 9418 ,582	4	$\left\{\begin{array}{c} 23,65\\ 23,70\\ 18,66 \end{array}\right.$	24,96 25,02 19,97	$5p {}^4D^{\circ} - 5d {}^4P$ $5p {}^4S^{\circ} - 5d {}^4P$ $3d {}^2D - 4p {}^2S^{\circ}$	$^{1/_{2}$ $^{-3/_{2}}$ $^{3/_{2}$ $^{-5/_{2}}$ $^{3/_{2}}$ $^{-1/_{2}}$
9374,163 9360,466 9344,793 9331,05 9313,51	3 1 2 1 1	18,29 23,01 25,31 23,48 24,62	19,61 24,34 26,63 24,81 25,95	$3d^{4}P-4p^{4}D^{\circ}$ $4d^{4}F-(^{3}P_{1})4f^{\circ}[3]^{\circ}$ $5p'^{2}D^{\circ}-5d'^{2}F$ $5p^{4}P^{\circ}-5d^{4}D$ $4d'^{2}G-(^{1}D)4f^{\circ}[4]^{\circ}$	3/2 - 3/2 $7/2 - 7/2$ $5/2 - 7/2$ $1/2 - 3/2$ $9/2 - 9/2$
9305 ,87 9279 ,712 9258 ,78 9252 ,628 9219 ,001	1 4 1 2 2	24,62 18,43 25,31 22,84 23,62	25,95 19,76 26,64 24,18 24,96	$\begin{array}{c} 4d' \ ^2G - (^1D)4f \ [4]^{\circ} \\ 4s' \ ^2D - 4p \ ^2D^{\circ} \\ 5p' \ ^2D^{\circ} - 5d' \ ^2F \\ 4d \ ^4D - (^3P_2)4f \ [2]^{\circ} \\ 5p \ ^2P^{\circ} - 5d \ ^4F \end{array}$	7/2 $7/2$ $3/2$ $3/2$ $3/2$ $3/2$ $5/2$ $1/2$ $3/2$ $5/2$ $1/2$ $3/2$ $5/2$
9210,39 9192,605 9194,47 9168,917 9159,030	1 3 1 1 2	18,33 22,81 21,35 22,82 22,26	19,68 24,16 22,70 24,18 23,62	$3d^{4}P-4p^{2}D^{\circ}$ $4d^{4}D-(^{3}P_{2})4f^{\circ}[3]^{\circ}$ $4p'^{2}P^{\circ}-5s^{2}P$ $3d'^{2}S-(^{3}P_{2})4f^{\circ}[2]^{\circ}$ $3d''^{2}D-5p^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
9156,049 9150,82 9106,573 9098,58 9095,099	3 1 4 2 3	23,44 18,29 23,48 23,65 25,19	24,79 19,64 24,84 25,01 26,55	$5p ^4P^{\circ} - 5d ^4D$ $3d ^4P - 4p ^4D^{\circ}$ $5p ^4D^{\circ} - 5d ^4F$ $5p ^4D^{\circ} - 5d ^4F$ $5p' ^2F^{\circ} - 5d' ^2G$	3/2 - 5/2 $3/2 - 1/2$ $7/2 - 9/2$ $1/2 - 3/2$ $7/2 - 9/2$
9079,707 9068,023 9060,749 9051,236 9035,915	2 5 3 1 3	22,81 22,79 25,19 22,81 22,79	24,18 24,15 26,55 24,18 24,16	$\begin{array}{c} 4d\ ^4D - (^3P_2)4f\ [2\]^\circ \\ 4d\ ^4D - (^3P_2)4f\ [4\]^\circ \\ 5p'\ ^2F^\circ - 5d'\ ^2G \\ 4d\ ^4D - (^3P_2)4f\ [2\]^\circ \\ 4d\ ^4D - (^3P_2)4f\ [3\]^\circ \end{array}$	3/2 - 3/2 $5/2 - 7/2$ $5/2 - 7/2$ $5/2 - 5/2$ $5/2 - 5/2$
9031,35 9017,596 9014,938 9008,455 8997,803	1 7 1 6 4	23,44 18,43 22,84 23,62 23,44	24,81 19,80 24,21 24,99 24,81	$5p {}^{4}P^{\circ} - 6s {}^{4}P$ $4s' {}^{2}D - 4p {}^{2}P^{\circ}$ $4d {}^{4}D - ({}^{3}P_{2})4f [1]^{\circ}$ $5p {}^{2}D^{\circ} - 5d {}^{2}F$ $5p {}^{4}P^{\circ} - 5d {}^{4}D$	3/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $1/2 - 1/2$ $5/2 - 7/2$ $3/2 - 3/2$
8995,865 8986,615 8971,365 8968,947 8937,530	7 6 4 4 1	23,40 22,77 23,68 22,77 22,77	24,78 24,15 25,06 24,15 24,16	$5p {}^{4}P^{\circ} - 5d {}^{4}D$ $4d {}^{4}D - ({}^{3}P_{2})4f [4]^{\circ}$ $5p {}^{2}D^{\circ} - 5d {}^{2}F$ $4d {}^{4}D - ({}^{3}P_{2})4f [4]^{\circ}$ $4d {}^{4}D - ({}^{3}P_{2})4f [3]^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
8935,448 8931,326 8926,819 8926,074 8920,198	1 5 1 3 2	22,82 23,40 22,79 18,25 22,77	24,21 24,79 24,18 19,64 24,16	$3d' {}^{2}S$ — $({}^{3}P_{2})4f [1]^{\circ}$ $5p {}^{4}P^{\circ}$ — $5d {}^{4}D$ $4d {}^{4}D$ — $({}^{3}P_{2})4f [2]^{\circ}$ $3d {}^{4}P$ — $4p {}^{4}D^{\circ}$ $4d {}^{4}D$ — $({}^{3}P_{2})4f [3]^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 7/_{2} - 7/_{2} \end{array} $
8915,522 8905,650 8904,512 8899,297 8895,144	1 6 4 3 1	23,62 23,51 18,29 22,79 23,57	25,01 24,90 19,68 24,18 24,96	$5p ^{2}P^{\circ} - 5d ^{4}F$ $5p ^{4}D^{\circ} - 5d ^{4}F$ $3d ^{4}P - 4p ^{2}D^{\circ}$ $4d ^{4}D - (^{3}P_{2})4f [2]^{\circ}$ $5p ^{4}D^{\circ} - 5d ^{4}P$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 5/2$ $5/2 - 5/2$ $5/2 - 5/2$ $3/2 - 3/2$
8890,147 8870,216 8867,170 8850,695 8842,527	4 1 2 1 1	23,57 23,62 23,62 22,81 24,18	24,96 25,02 25,02 24,21 25,58	$\begin{array}{c} 5p \ ^4D^{\circ} - 5d \ ^4F \\ 5p \ ^2D^{\circ} - 5d \ ^4P \\ 5p \ ^2P^{\circ} - 5d \ ^4P \\ 4d \ ^4D - (^3P_2)4f \ [1]^{\circ} \\ (^3P_2)^4f \ [2]^{\circ} - (^3P_1)5g \ [3] \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array} $
8838,009 8803,860 8796,142 8790,555 8771,855	1 1 5 1 15	22,81 22,77 23,44 23,40 18,45	24,21 24,18 24,84 24,81 19,87	$\begin{array}{c} 4d\ ^4D - (^3P_2)4f\ [1\]^\circ \\ 4d\ ^4D - (^3P_2)4f\ [2\]^\circ \\ 5p\ ^4P^\circ - 5d\ ^4D \\ 5p\ ^4P^\circ - 4d'\ ^2F \\ 4s'\ ^2D - 4p\ ^2P^\circ \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
8768 ,215	1	23,89	25,31	4d ² D-5p' ² D°	3/2 - 3/2 $5/2 - 3/2$ $7/2 - 7/2$ $5/2 - 5/2$ $5/2 - 3/2$
8754 ,009	2	22,26	23,68	3d" ² D-5p ² D°	
8719 ,374	3	23,48	24,90	5p ⁴ D°-5d ⁴ F	
8716 ,947	1	23,40	24,82	5p ⁴ P°-4d' ² F	
8693 ,086	2	22,79	24,21	4d ⁴ D-(³ P ₂)4f [1]°	
8674,767 8657,390 8631,102 8623,804 8607,611	1 1 1 5 2	23,58 24,15 23,44 23,48 23,57	25,01 25,58 24,87 24,92 25,01	$\begin{array}{c} 5p\ ^2P^\circ - 5d\ ^4F \\ (^3P_2)^4f\ [^4]^\circ - (^3P_4)^5g\ [^5] \\ 5p\ ^4P^\circ - 6s\ ^2P \\ 5p\ ^4P^\circ - 5d\ ^4P \\ 5p\ ^4D^\circ - 5d\ ^4F \end{array}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 9/_{2} - 11/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array} $
8604,016 8592,624 8585,262 8562,550 8547,023	6 3 3 2 4	18,43 25,19 23,62 23,57 23,51	19,87 26,63 25,06 25,02 24,96	$4s' ^{2}D - 4p ^{2}P^{\circ}$ $5p' ^{2}F^{\circ} - 5d' ^{2}F$ $5p ^{2}D^{\circ} - 5d ^{2}F$ $5p ^{4}D^{\circ} - 5d ^{4}P$ $5p ^{4}D^{\circ} - 5d ^{4}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
8500,997	2	25,19	26,64	5p' 2F°-5d' 2F	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
8411,88	1	22,84	24,31	4d 4D-(3P ₁)4f [2]°	
8395,734	3	23,48	24,96	5p 4P°-5d 4P	
8376,079	2	17,74	19,22	3d.4F-4p 4P°	
8363,074	2	23,51	24,99	5p 4D°-5d 2F	
8346,420	1	21,35	22,84	4p' 2P°-4d 4D	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
8345,183	2	17,77	19,26	3d 4F-4p 4P°	
8342,630	1	22,82	24,31	3d' 2S-(3P ₁)4f [2]°	
8338,384	1	23,44	24,92	5p 4P°-5d 4P	
8327,907	2	18,06	19,55	3d 2P-4p 4D°	
8296,723	1	23,57	25,06	5p ⁴ D°-5d ² F	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
8259,521	2	22,81	24,31	4d ⁴ D-(³ P ₁)4f [2]°	
8217,817	1	18,25	19,76	3d ⁴ P-4p ² D°	
8190,258	1	18,45	19,97	4s' ² D-4p ⁴ S°	
8165,405	3	17,74	19,26	3d ⁴ F-4p ⁴ P°	
8150,647	1	23,89	25,41	4d ² D—(³ P ₂)5f [3] ⁶	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array} $
8110,65	1	17,69	19,22	3d ⁴ F—4p ⁴ P°	
8083,75	1	23,89	25,42	4d ² D—(³ P ₂)5f [2]°	
8044,308	2	22,77	24,31	4d ⁴ D—(³ P ₁)4f [4]°	
8036,853	2	23,87	25,41	4d ² D—(³ P ₂)5f [3]°	
8034,625	1	23,80	25,34	4p" ² P°-5d ² D	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
8017,542	2	18,43	19,97	4s' ² D-4p ² S°	
7992,90	1	22,79	24,34	4d ⁴ D-(³ P ₁)4f [3]°	
7983,61	1	23,87	25,42	4d ² D-(³ P ₂)5f [2]°	
7927,35	2	23,80	25,36	4p" ² P°-5d ² D	
7915,813 7904,770 7849,397 7846,555 7802,252	1 2 3 2 1	22,77 $22,81$ $18,29$ $23,48$ $23,44$ $24,19$	24,34 24,38 19,87 25,06 25,02 25,78	$\begin{array}{c} 4d \ ^4D - (^3P_1)4f \ [3]^{\circ} \\ 4d \ ^4D - (^3P_0)4f \ [3]^{\circ} \\ 3d \ ^4P - 4p \ ^2P^{\circ} \\ 5p \ ^4D^{\circ} - 5d \ ^2F \\ 5p \ ^4P^{\circ} - 5d \ ^4P \\ (^3P_2)4f \ [5]^{\circ} - 6d \ ^4F \end{array}$	$ \begin{array}{c} 7/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 11/2 - 9/2 \end{array} $
7795,410 7757,003 7753,28 7683,458 7681,49	2 1 1 1 1	22,79 23,85 24,15 18,25 24,19	24,38 25,44 25,75 19,87 25,80	$\begin{array}{c} 4d ^4D - (^3P_{0})4f [3]^{\circ} \\ 4p'' ^2P^{\circ} - 5d ^2P \\ (^3P_{2})4f [4]^{\circ} - 6d ^4D \\ 3d ^4P - 4p ^2P^{\circ} \\ (^3P_{2})4f [5]^{\circ} - 6d ^4F \end{array}$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \end{array}$
7680,948 7654,031 7618,03 7589,320 7505,153	$egin{array}{c} 2 \\ 2 \\ 1 \\ 15 \\ 1 \end{array}$	23,40 18,06 19,80 18,33 19,97	25,02 19,68 21,43 19,97 21,62	$5p ^4P^{\circ} - 5d ^4P$ $3d ^2P - 4p ^2D^{\circ}$ $4p ^2P^{\circ} - 3d' ^2D$ $3d ^4P - 4p ^4S^{\circ}$ $4p ^2S^{\circ} - 3d' ^2P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
7455 ,996	2	23,89	25,55	$4d ^{2}D$ — $(^{3}P_{1})5f [2]^{\circ}$	$\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$
7440 ,491	4	19,76	21,43	$4p ^{2}D^{\circ}$ — $3d' ^{2}D$	

λ, Α	I	E _H , eV	$E_{\rm B}$. eV	Transition	J
7428 ,574 7419 ,341 7380 ,433	2 1 15	17,94 23,67 18,29	19,61 25,34 19,97	$3d^{2}P - 4p^{4}D^{\circ}$ $5p^{2}S^{\circ} - 5d^{2}D$ $3d^{4}P - 4p^{4}S^{\circ}$	$^{1/_{2}$ $^{-3/_{2}}$ $^{1/_{2}$ $^{-3/_{2}}$ $^{3/_{2}}$ $^{-3/_{2}}$
7358,338 7355,180 7348,049 7284,236 7280,454	$\begin{array}{c} 2 \\ 2 \\ 7 \\ 4 \\ 2 \end{array}$	18,29 23,87 19,68 18,06 19,97	19,97 25,56 21,37 19,76 21,67	$3d^{4}P-4p^{2}S^{\circ}$ $4d^{2}D-(^{3}P_{4})5f^{[4]}{}^{\circ}$ $4p^{2}D^{\circ}-3d'^{2}D$ $3d^{2}P-4p^{2}D^{\circ}$ $4p^{2}S^{\circ}-3d'^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
7233,546 7182,098 7121,740 7101,190 7090,560	15 2 4 1 1	18,25 23,89 18,06 23,62 19,68	19,97 25,62 19,80 25,36 21,43	3d ⁴ P-4p ⁴ S° 4d ² D-(³ P ₀)5f [3]° 3d ² P-4p ² P° 5p ² P°-5d ³ D 4p ² D°-3d′ ² D	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 5/_2 - 3/_2 \end{array} $
7077,024 7054,993 6990,122 6985,708 6900,880	5 3 5 1 2	17,74 19,87 17,77 23,57 23,63	19,49 21,62 19,55 25,34 25,42	$3d {}^{4}F - 4p {}^{4}D^{\circ}$ $4p {}^{2}P^{\circ} - 3d' {}^{2}P$ $3d {}^{4}F - 4p {}^{4}D^{\circ}$ $5p {}^{4}D^{\circ} - 5d {}^{2}D$ $4d {}^{2}P - ({}^{3}P_{2})5f [2]^{\circ}$	$ \begin{array}{c} 5/_2 - 7/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \end{array} $
6886,618 6863,535 6861,270 6846,540 6839,584	20 20 15 1 4	17,69 17,74 18,06 23,63 21,67	19,49 19,55 19,87 25,44 23,48	$\begin{array}{c} 3d \ ^{4}F-4p \ ^{4}D^{\circ} \\ 3d \ ^{4}F-4p \ ^{4}D^{\circ} \\ 3d \ ^{2}P-4p \ ^{2}P^{\circ} \\ 4d \ ^{2}P-(^{3}P_{2})5f \ [1]^{\circ} \\ 3d' \ ^{2}P-5p \ ^{4}P^{\circ} \end{array}$	7/2 - 7/2 $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$ $1/2 - 1/2$
6818,371 6808,532 6799,288 6756,548 6696,296	8 9 3 20 4	19,55 17,94 19,80 17,77 22,31	21,37 19,76 21,62 19,61 24,16	$4p ^{4}D^{\circ} - 3d' ^{2}D$ $3d ^{2}P - 4p ^{2}D^{\circ}$ $4p ^{2}P^{\circ} - 3d' ^{2}P$ $3d ^{4}F - 4p ^{4}D^{\circ}$ $3d'' ^{2}D - (^{3}P_{2})4f [3]^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
6684,307 6666,356 6657,499 6653,583 6643,716	50 15 2 1 100	17,69 17,94 19,76 23,58 17,63	19,55 19,80 21,62 25,44 19,49	$3d {}^{4}F - 4p {}^{4}D^{\circ} \ 3d {}^{2}P - 4p {}^{2}P^{\circ} \ 4p {}^{2}D^{\circ} - 3a' {}^{2}P \ 5p {}^{2}P^{\circ} - 5d {}^{2}P \ 3d {}^{4}F - 4p {}^{4}D^{\circ}$	$ \begin{array}{c} 7/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \end{array} $
6639,743 6638,226 6620,977 6614,354 6611,196	$ \begin{array}{c} 30 \\ 50 \\ 6 \\ 6 \\ 2 \end{array} $	17,77 17,74 22,31 19,80 23,55	19,64 19,61 24,18 21,67 25,42	$3d^{4}F-4p^{4}D^{\circ}$ $3d^{4}F-4p^{4}D^{\circ}$ $3d''^{2}D-(^{3}P_{2})^{4}f^{2}$ $4p^{2}P^{\circ}-3d'^{2}P$ $4d^{2}P-(^{3}P_{2})^{5}f^{2}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
6564,170 6557,724 6551,498 6547,350 6540,409	3 2 3 3 2	22,26 21,62 23,55 21,26 21,67	24,15 23,51 25,44 24,16 23,57	$3d'' ^{2}D - (^{3}P_{2})4f [4]^{\circ}$ $3d' ^{2}P - 5p ^{4}D^{\circ}$ $4d ^{2}P - (^{3}P_{2})5f [1]^{\circ}$ $3d'' ^{2}D - (^{3}P_{2})4f [3]^{\circ}$ $3d' ^{2}P - 5p ^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
6532,927 6509,089 6508,184 6506,138 6502,157	2 6 6 3 3	23,80 17,77 24,21 22,31 21,67	25,70 19,68 26,12 24,21 23,58	$4p'' {}^{2}P^{\circ} - 7s {}^{4}P$ $3d {}^{4}F - 4p {}^{2}D^{\circ}$ $({}^{3}P_{2})4f [1]^{\circ} - ({}^{3}P_{2})6g [2]$ $3d'' {}^{2}D - ({}^{3}P_{2})4f [1]^{\circ}$ $3d' {}^{2}P - 5p {}^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
6501,348 6500,216 6483,076 6480,085 6475,312	4 12 20 2 4	24,21 18,06 18,06 19,76 22,26	26,12 19,97 19,97 21,67 24,18	$(^{3}P_{2})^{4}f$ [1]°- $(^{3}P_{2})^{6}g$ [2] $3d$ ^{2}P - ^{4}p ^{4}S ° $3d$ ^{2}P - ^{4}p ^{2}S ° ^{4}p ^{2}D °- $^{3}d'$ ^{2}P $^{3}d''$ ^{2}D - $^{(^{3}P_{2})^{4}f}$ [2]°	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
6472,431 6468,050 6458,403 6456,489 6445,117	6 7 2 3 1	24,34 24,34 24,19 24,19 23,63	26,25 26,25 26,41 26,41 25,55	$(^{3}P_{1})4f$ $[3]^{\circ}$ — $(^{3}P_{1})6g$ $[4]$ $(^{3}P_{1})4f$ $[3]^{\circ}$ — $(^{3}P_{1})6g$ $[4]$ $(^{3}P_{2})4f$ $[5]^{\circ}$ — $(^{3}P_{2})6g$ $[5]$ $(^{3}P_{2})4f$ $[5]^{\circ}$ — $(^{3}P_{2})6g$ $[5]$ $(^{3}P_{2})4f$ $[5]^{\circ}$ — $(^{3}P_{1})5f$ $[2]^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 9/2 - 9/2 \\ 11/2 - 11/2 \\ 3/2 - 3/2 \end{array}$
350					

λ, Α	I	E _H , eV	E _B , eV	Transition	J
6443,858 6441,908 6437,604 6433,683 6424,144	8 9 8 1 1	24,19 24,19 17,94 23,17 23,26	26,11 26,11 19,87 25,10 25,19	$(^{3}P_{2})^{4}f [5]^{\circ} - (^{3}P_{2})^{6}g [6]$ $(^{3}P_{2})^{4}f [5]^{\circ} - (^{3}P_{2})^{6}g [6]$ $^{3}d ^{2}P - ^{4}p ^{2}P^{\circ}$ $^{4}d ^{4}P - ^{6}p ^{4}D^{\circ}$ $^{4}d ^{2}F - ^{5}p' ^{2}F^{\circ}$	$ \begin{array}{c} 9/2 - 11/2 \\ 11/2 - 13/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
6422,903 6418,354 6417,417 6408,904 6403,004	6 8 1 6	24,38 24,38 24,18 24,18 24,31	26,31 26,31 26,11 26,11 26,25	$ \begin{array}{c} (^3P_{0})4f \ [3]^{\circ}-(^3P_{0})6g \ [4] \\ (^3P_{0})4f \ [3]^{\circ}-(^3P_{0})6g \ [4] \\ (^3P_{2})4f \ [2]^{\circ}-(^3P_{2})6g \ [4] \\ (^3P_{2})4f \ [2]^{\circ}-(^3P_{2})6g \ [3] \\ (^3P_{4})4f \ [4]^{\circ}-(^3P_{4})6g \ [5] \end{array} $	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \end{array} $
6399 ,215 6397 ,184 6396 ,614 6394 ,723 6393 ,803	15 2 7 5 6	17,74 24,18 24,31 24,18 24,31	19,68 26,12 26,25 26,11 26,25	$\begin{array}{c} 3d \ ^4F - 4p \ ^2D^{\circ} \\ (^3P_2)^4f \ [2]^{\circ} - (^3P_2)^6g \ [2] \\ (^3P_1)^4f \ [4]^{\circ} - (^3P_1)^6g \ [5] \\ (^3P_2)^4f \ [2]^{\circ} - (^3P_2)^6g \ [3] \\ (^3P_1)^4f \ [2]^{\circ} - (^3P_1)^6g \ [3] \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6391,117 6388,335 6383,095 6382,696 6375,945	2 5 2 3 3	$ \left\{ \begin{array}{l} 24,31 \\ 24,31 \\ 24,31 \\ 24,18 \\ 23,63 \\ 19,68 \end{array} \right. $	26,25 26,25 26,25 26,12 25,57 21,62	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	7/2— $7/2$ $7/2$ — $9/2$ $3/2$ — $5/2$ $3/2$ — $5/2$ $3/2$ — $5/2$ $3/2$ — $5/2$ $5/2$ — $3/2$
6369,128 6365,440 6357,668 6357,025 6348,601	2 1 5 6 2	21,62 22,26 24,16 24,16 24,16	23,57 24,21 26,11 26,11 26,11	$\begin{array}{c} 3d'\ ^2P-5p\ ^4D^{\circ} \\ 3d''\ ^2D-(^3P_2)4f\ [1]^{\circ} \\ (^3P_2)4f\ [3]^{\circ}-(^3P_2)6g\ [5] \\ (^3P_2)4f\ [3]^{\circ}-(^3P_2)6g\ [4] \\ (^3P_2)4f\ [3]^{\circ}-(^3P_2)6g\ [3] \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \end{array} $
6348,227 6339,897 6333,142 6332,832 6332,499	6 3 5 1 5	24,16 24,16 24,15 21,62 24,15	26,11 26,11 26,11 23,58 26,11	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 1/2 \\ 7/2 - 9/2 \end{array} $
6328,474 6326,117 6324,414 6323,735 6315,40	1 2 8 3 1	24,16 25,89 24,15 24,15 24,15	26,12 27,85 26,11 26,11 26,11	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 11/2, 9/2 - 13/2, 11/2 \\ 9/2 - 11/2 \\ 9/2 - 9/2 \\ 9/2 - 7/2 \end{array} $
6295,446 6282,823 6277,425 6249,975 6243,125	2 1 2 1 25	23,89 21,67 23,70 23,85 17,69	25,86 23,65 25,67 25,83 19,68	$\begin{array}{c} 4d\ ^2D-(^1D)4f\ [1\]^\circ \\ 3d'\ ^2P-5p\ ^4D^\circ \\ 5p\ ^4S^\circ-7s\ ^4P \\ 4p''\ ^2P^\circ-7s\ ^4P \\ 3d\ ^4F-4p\ ^2D^\circ \end{array}$	$ \begin{array}{c} 3/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 1/_2 \\ 7/_2 - 5/_2 \end{array} $
6239,713 6232,892 6210,420 6208,935 6206,463	7 2 1 2	17,77 23,63 21,62 21,62 23,70	19,76 25,62 23,62 23,62 25,70	$3d {}^{4}F$ $-4p {}^{2}D^{\circ}$ $4d {}^{2}P$ $-({}^{3}P_{0})5f [3]^{\circ}$ $3d' {}^{2}P$ $-5p {}^{2}P^{\circ}$ $3d' {}^{2}P$ $-5p {}^{2}D^{\circ}$ $5p {}^{4}S^{\circ}$ $-7s {}^{4}P$	3/2 - 3/2 $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$
6201,099 6192,301 6187,136 6183,024 6174,378	6 2 6 2 3	21,67 22,31 21,31 23,55 21,67	23,67 24,31 24,31 25,55 23,68	$\begin{array}{c} 3d' \ ^{2}P - 5p \ ^{2}S^{\circ} \\ 3d'' \ ^{2}D - (^{3}P_{4})^{4}f \ [2]^{\circ} \\ 3d'' \ ^{2}D - (^{3}P_{4})^{4}f \ [2]^{\circ} \\ 4d \ ^{2}P - (^{2}P_{4})5f \ [2]^{\circ} \\ 3d' \ ^{3}P - 5p \ ^{2}D^{\circ} \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
6172,290 6167,628 6166,790 6142,615 6138,660	40 3 3 2 12	$19,11 \\ 23,89 \\ 21,43 \\ 23,89 \\ 23,80 \\ 21,14 \\ 47,74$	21,13 25,90 23,44 25,90 25,82 23,16 19,76	$3d' {}^{2}G - 4p' {}^{2}F^{\circ}$ $4d {}^{2}D - (^{1}D)4f [2]^{\circ}$ $3d' {}^{2}D - 5p {}^{4}P^{\circ}$ $4d {}^{2}D - (^{1}D)4f [2]^{\circ}$ $4p'' {}^{2}P^{\circ} - 7s {}^{2}P$ $4p' {}^{2}F^{\circ} - 4d {}^{2}F^{?}$ $3d {}^{4}F - 4p {}^{2}D^{\circ}$	7/2 - 5/2 $3/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $7/2 - 7/2$ $5/2 - 3/2$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
6124,571 6123,368 6120,102 6118,724 6114,929	3 15 5 4 50	21,62 19,11 17,77 17,94 19,11	23,65 21,14 19,80 19,97 21,14	$3d'\ ^{2}P-5p\ ^{4}D^{\circ}\ 3d'\ ^{2}G-4p'\ ^{2}F^{\circ}\ 3d\ ^{4}F-4p\ ^{2}P^{\circ}\ 3d\ ^{2}P-4p\ ^{4}S^{\circ}\ 3d'\ ^{2}G-4p'\ ^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 7/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \end{array} $
6111,742 6109,15 6103,546 6102,765 6101,925	$egin{pmatrix} 2 \\ 2 \\ 12 \\ 1 \\ 3 \end{bmatrix}$	23,87 23,87 17,94 23,16 22,31	25,90 25,90 19,97 25,19 24,34	$\begin{array}{c} 4d\ ^{2}D-(^{3}P_{2})7p\ [2]^{\circ} \\ 4d\ ^{2}D-(^{1}D)4f\ [2]^{\circ} \\ 3d\ ^{2}P-4p\ ^{2}S^{\circ} \\ 4d\ ^{2}F-5p'\ ^{2}F^{\circ} \\ 3d''\ ^{2}D-(^{3}P_{1})4f\ [3]^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6084,507 6083,875 6077,431 6049,072 6046,894	2 2 6 6 8	21,37 23,85 17,26 22,26 21,62	23,40 25,88 19,30 24,31 23,67	$3d'\ ^{2}D$ -5 $p\ ^{4}P^{\circ}$ $4p''\ ^{2}P^{\circ}$ -7 $s\ ^{2}P$ $4s\ ^{2}P$ -4 $p\ ^{4}P^{\circ}$ $3d''\ ^{2}D$ -($^{3}P_{1}$)4 $f\ [4]^{\circ}$ $3d''\ ^{2}P$ -5 $p\ ^{2}S^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array}$
6044,468 6030,844 6028,220 6027,248 6019,493	7 1 1 5 4	23,89 23,70 23,62 21,49 21,43	25,94 25,76 25,67 23,55 23,48	$\begin{array}{c} 4d\ ^{2}D-(^{1}D)4f\ [3\]^{\circ} \\ 5p\ ^{4}S^{\circ}-6d\ ^{4}D \\ 5p\ ^{2}D^{\circ}-7s\ ^{4}P \\ 4p'\ ^{2}D^{\circ}-4d\ ^{2}P \\ 3d'\ ^{2}D-5p\ ^{4}P^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
6003,470 5989,339 5988,288 5985,920 5984,454	1 8 3 7 3	19,61 23,87 23,87 22,31 21,37	21,67 25,94 25,94 24,38 23,44	$4p ^4D^{\circ} - 3d' ^2P$ $4d ^2D - (^1D)4f [3]^{\circ}$ $4d ^2D - (^1D)4f [3]^{\circ}$ $3d'' ^2D - (^3P_0)4f [3]^{\circ}$ $3d' ^2D - 5p ^4P^{\circ}$	3/2 - 1/2 $5/2 - 7/2$ $5/2 - 5/2$ $3/2 - 5/2$ $5/2 - 3/2$
5977,995 5975,945 5973,314 5965,031 5953,820	4 2 2 3 2	22,26 24,18 19,55 21,62 23,80	24,34 26,25 21,62 23,70 25,88	$\begin{array}{c} 3d'' ^2D - (^3P_1)4f [3]^{\circ} \\ (^3P_2)4f [2]^{\circ} - (^3P_1)6g [3] \\ 4p ^4D^{\circ} - 3d' ^2P \\ 3d' ^2P - 5p ^4S^{\circ} \\ 4p'' ^2P^{\circ} - 7s ^2P \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
5950,905 5941,825 5936,64 5935,792 5904,291	6 4 1 2 2	17,14 $21,43$ $23,17$ $23,70$ $24,15$ $24,15$	19,22 23,51 25,26 25,79 26,25 26,25	$\begin{array}{c} 4s\ ^{2}P-4p\ ^{4}P^{\circ} \\ 3d'\ ^{2}D-5p\ ^{4}D^{\circ} \\ 4d\ ^{4}P-6p\ ^{2}P^{\circ} \\ 5p\ ^{4}S^{\circ}-6d\ ^{4}D \\ (^{3}P_{2})^{4}f\ [4\]^{\circ}-(^{3}P_{1})6g\ [5\] \\ (^{3}P_{2})^{4}f\ [4\]^{\circ}-(^{3}P_{1})6g\ [5\] \end{array}$	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 3/2$ $3/2 - 3/2$ $9/2 - 11/2$ $9/2 - 9/2$
5886,088 5870,443 5866,598 5853,10 5843,781	3 4 2 2 7	19,26 22,26 22,26 23,70 17,14	21,37 24,38 24,38 25,82 19,26	$\begin{array}{c} 4p ^4P^{\circ} - 3d' ^2D \\ 3d'' ^2D - (^3P_0)4f [3]^{\circ} \\ 3d'' ^2D - (^3P_0)4f [3]^{\circ} \\ 5p ^4S^{\circ} - 7s ^2P \\ 4s ^2P - 4p ^4P^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5840,048 5838,96 5828,059 5826,036 5822,114	1 1 3 2 3	21,43 19,30 21,67 23,70 23,57	23,55 21,43 23,80 25,83 25,70	$4p' \ ^{2}P^{\circ}$ — $4d \ ^{2}P$ $4p \ ^{4}P^{\circ}$ — $3d' \ ^{2}D$ $3d' \ ^{2}P$ — $4p'' \ ^{2}P^{\circ}$ $5p \ ^{4}S^{\circ}$ — $7s \ ^{4}P$ $5p \ ^{4}D^{\circ}$ — $7s \ ^{4}P$	$ \begin{array}{c} \frac{1}{2} - \frac{1}{2} \\ \frac{1}{2} - \frac{3}{2} \\ \frac{1}{2} - \frac{3}{2} \\ \frac{3}{2} - \frac{1}{2} \\ \frac{3}{2} - \frac{3}{2} \end{array} $
5816,272 5812,746 5807,596 5800,46 5799,734	2 6 1 1 3	21,43 21,50 24,49 23,62 23,68	23,26 23,63 26,32 25,76 25,82	$\begin{array}{c} 4p'\ ^2F°-4d\ ^2F?\\ 4p'\ ^2D°-4d\ ^2P\\ (^3P_2)^4f\ [5]^\circ-7d\ ^4F\\ 5p\ ^2D°-6d\ ^4D\\ 5p\ ^2D°-7s\ ^2P \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5786,560 5781,268 5776,374 5774,697 5772,326	5 2 2 1 5	21,43 19,22 23,67 23,70 21,37	23,57 21,37 25,82 25,85 23,51	$3d' ^{2}D - 5p ^{4}D^{\circ}$ $4p ^{4}P^{\circ} - 3d' ^{2}D$ $5p ^{2}S^{\circ} - 7s ^{2}P$ $5p ^{4}S^{\circ} - 6d ^{4}P$ $3d' ^{2}D - 5p ^{4}D^{\circ}$	3/2 - 3/2 $5/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$ $5/2 - 5/2$
5766,542 5756,600	$\frac{2}{3}$	22,95 21,43	25,40 23,58	$\frac{4d~^4F-6p~^4D^{\circ}}{3d'~^2D-5p~^2P^{\circ}}$	$^{9}/_{2}$ _ $^{7}/_{2}$ $^{3}/_{2}$ _ $^{1}/_{2}$

				Tourisies	
λ, Α	I	E _H , eV	E _B , eV	Transition	J
5753,54 5743,278 5732,694	1 2 1	24,15 23,26 23,80	26,31 25,41 25,96	$ \begin{array}{c} (^{3}P_{2})4f[4]^{\circ}-(^{3}P_{0})6g[4]\\ 4d^{2}F-(^{3}P_{2})5f[3]^{\circ}\\ 4p''^{2}P^{\circ}-6d^{2}D \end{array} $	$\frac{7}{2}$ $\frac{9}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5732,210 5724,325 5716,029 5711,453 5708,616	1 5 1 1	23,51 17,14 23,26 23,70 21,67	25,67 19,30 25,42 25,87 23,85	$5p ^4D^{\circ} - 7s ^4P$ $4s ^2P - 4p ^4P^{\circ}$ $4d ^2F - (^3P_2) 5f [2]^{\circ}$ $5p ^4S^{\circ} - 6d ^4F$ $3d' ^2P - 4p'' ^2P^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array}$
5707,215 5704,371 5691,650 5681,480	1 3 8 2	$23,65 \\ 23,70 \\ 21,62 \\ 23,65 \\ 23,70 \\ 23,70$	25,82 25,87 23,80 25,83 25,88	$5p ^4D^{\circ} - 7s ^2P$ $5p ^4S^{\circ} - 6d ^4P$ $3d' ^2P - 4p'' ^2P^{\circ}$ $5p ^4D^{\circ} - 7s ^4P$ $5p ^4S^{\circ} - 7s ^2P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
5672 ,952	7	$\left\{\begin{array}{cc} 23,51\\ 23,80 \end{array}\right.$	$25,70 \\ 25,98$	$^{5p}_{4p''}^{4}D^{\circ}$ —7s ^{4}P $^{4p''}^{2}P^{\circ}$ —6d ^{2}P	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5655,236 5654,450 5654,020 5642,413 5635,882	2 8 2 2 5	21,43 23,48 21,43 17,77 23,62	23,62 25,67 23,62 19,97 25,82	$3d' ^{2}D - 5p ^{2}P^{\circ} \ 5p ^{4}D^{\circ} - 7s ^{4}P \ 3d' ^{2}D - 5p ^{2}D^{\circ} \ 3d ^{4}F - 4p ^{2}S^{\circ} \ 5p ^{2}D^{\circ} - 7s ^{2}P$	3/2 - 3/2 $7/2 - 5/2$ $3/2 - 5/2$ $3/2 - 1/2$ $5/2 - 3/2$
5634,661 5631,381 5631,160 5625,684 5624,005	$\begin{array}{c} 2 \\ 1 \\ 3 \\ 6 \\ 1 \end{array}$	23,62 23,89 23,68 21,37 21,43	25,82 26,09 25,88 23,57 23,63	5p ² P°—7s ² P 4d ² D—(³ P ₂) 6f [3]° 5p ² D°—7s ² P 3d′ ² D—5p ⁴ D° 4p′ ² P°—4d ² P	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 1/_{2} \\ 5/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array}$
5611,667 5609,578 5603,932 5593,52 5592,200	2 2 2 1 1	23,89 23,62 23,48 23,89 23,01	26,10 25,83 25,70 26,11 25,23	4d ² D—(³ P ₂) 6f [2] ^c 5p ² P°—7s ⁴ P 5p ⁴ P°—7s ⁴ P 4d ² D—(³ P ₂) 6f [1] ^c 4d ⁴ F—6p ² D°	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
5582,61 5578,518 5577,689 5563,196 5554,050	1 6 8 2 8	23,87 23,87 21,62 23,87 { 23,63 23,63	26,09 26,09 23,85 26,10 25,86 25,86	$\begin{array}{c} 4d\ ^2D - (^3P_2)\ 6f\ [3]\\ 4d\ ^2D - (^3P_2)\ 6f\ [3]\\ 3d'\ ^2P - 4p''\ ^2P^\circ\\ 4d\ ^2D - (^3P_2)\ 6f\ [2]\\ 4d\ ^2P - (^1D)\ 4f\ [1]^\circ\\ 4d\ ^2P - (^1D)\ 4f\ [1]^\circ\end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
5545,045 5543,880 5537,290 5535,51 5525,856	6 1 5 1 2	23,70 23,65 23,44 23,17 23,51	25,94 25,88 25,67 25,41 25,76	$5p {}^{4}S^{\circ} - 6d {}^{4}P$ $5p {}^{4}D^{\circ} - 7s {}^{2}P$? $5p {}^{4}P^{\circ} - 7s {}^{4}P$ $4d {}^{4}P - ({}^{3}P_{2}) 5f [4]$ $5p {}^{4}D^{\circ} - 6d {}^{4}D$?	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
5523,690 5521,74 5519,337 5516,668 5514,367	2 1 4 2 4	23,70 23,17 21,43 23,16	25,94 25,41 23,67 25,41	$5p {}^{4}S^{\circ} - 6d {}^{4}F$ $4d {}^{4}P - ({}^{3}P_{2}) 5f [3]$ $3d' {}^{2}D - 5p {}^{2}S^{\circ}$ $4d {}^{2}F - ({}^{3}P_{2}) 5f [4]$	3/2—1/2 7/2—9/2 —
5513 ,303 5507 ,753 5504 ,917 5503 ,256 5501 ,480	1 4 3 3 2	23,58 23,80 22,82 23,62 21,37	25,83 26,05 25,07 25,87 23,62	$5p \ ^{2}P^{\circ}$ — $7s \ ^{4}P$ $4p'' \ ^{2}P^{\circ}$ — $6d \ ^{2}D$ $3d' \ ^{2}S$ — $6p \ ^{4}P^{\circ}$ $5p \ ^{2}P^{\circ}$ — $6d \ ^{4}F$ $3d' \ ^{2}D$ — $5p \ ^{2}P^{\circ}$	1/2 - 1/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $5/2 - 3/2$
5500,334 5498,972 5498,185 5497,123 5490,667	7 2 8 3 1	21,37 23,16 21,43 23,68 23,70	23,62 25,41 23,68 25,94 25,96	$3d'$ $^{2}D - 5p$ $^{2}D^{\circ}$ $4d$ $^{2}F - (^{3}P_{2})$ $5f$ [3 $3d'$ $^{2}D - 5p$ $^{2}D^{\circ}$ $5p$ $^{2}D^{\circ} - 6d$ ^{4}P $5p$ $^{4}S^{\circ} - 6d$ ^{2}F	$ \begin{array}{c} $
5486, 102, 5484 5484, 311	1 1	$23,57 \\ 22,84$	25,83 25,10	5p 4D°—7s 4P 4d 4D—6p 4P°	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

λ, λ	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
5481,997 5472,642 5470,307	1 1 2	23,44 22,81 22,84	25,70 25,07 25,10	$5p ^4P^{\circ} - 7s ^4P$ $4d ^4D - 6p ^4P^{\circ}$ $4d ^4D - 6p ^4D^{\circ}$	3/2 - 3/2 $3/2 - 3/2$ $3/2 - 3/2$ $1/2 - 3/2$
5469,105 5466,440 5456,382 5454,307	6 5 5	23,48 $23,16$ $23,63$ $(23,63)$	25,75 25,43 25,90 25,90	$5p ^4D^{\circ} - 6d ^4D$ $4d ^2F - (^3P_2) 5f [5]^{\circ}$ $4d ^2P - (^3P_2) 7p [2]^{\circ}$ $4d ^2P - (^1D) 4f [2]^{\circ}$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{9}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
5453,634	5	$\begin{cases} 23,40 \\ 23,63 \\ 23,48 \end{cases}$	$25,67 \ 25,90 \ 25,76$	$5p ^4P^{\circ} - 7s ^4P$ $4d ^2P - (^1D) ^4f [2]^{\circ}$ $5p ^4D^{\circ} - 6d ^4D$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array}$
5447,556 5443,681 5440,932 5439,676 5432,94	2 5 2 3 1	22,79 23,68 22,82 21,35 23,68	25,06 25,96 25,10 23,63 25,96	$4d ^4D - 6p ^4P^{\circ}$ $5p ^2D^{\circ} - 6d ^2F$ $3d' ^2S - 6p ^4D^{\circ}$ $4p' ^2P^{\circ} - 4d ^2P$ $5p ^2D^{\circ} - 6d ^2D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5416,710 5412,434 5411,646 5409,401 5407,348	1 2 3 1 7	22,79 23,67 22,77 22,81 23,51	25,07 25,96 25,06 25,10 25,80	$4d\ ^4D-6p\ ^4P^\circ \ 5p\ ^2S^\circ-6d\ ^2D \ ^4d\ ^4D-6p\ ^4P^\circ \ ^4d\ ^4D-6p\ ^4D^\circ \ 5p\ ^4D^\circ-6d\ ^4F$	$\begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \end{array}$
5402,604 5402,170 5400,62 5397,522 5394,81	8 1 1 9 1	23,62 22,80 23,40 23,48 23,26	25,91 25,10 25,70 25,78 25,55	$5p^{2}D^{\circ}-6d^{2}F$ $5s^{2}P-6p^{4}P^{\circ}$ $5p^{4}P^{\circ}-7s^{4}P$ $5p^{4}D^{\circ}-6d^{4}F$ $4d^{2}F-(^{3}P_{1})^{5}f^{[2]^{\circ}}$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 \end{array} $
5393,603 5386,519 5384,378 5382,330 5379,163	5 2 5 2 1	23,65 23,26 23,57 23,48 23,68	25,94 25,56 25,87 25,79 25,98	$5p ^4D^{\circ} - 6d ^4F$ $4d ^2F - (^3P_1) 5f [4]^{\circ}$ $5p ^4D^{\circ} - 6d ^4F$ $5p ^4P^{\circ} - 6d ^4D$ $5p ^2D^{\circ} - 6d ^2P$	$\begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 7/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 3/_2 \end{array}$
5378,078 5376,636 5372,007 5365,485 5364,142	3 3 2 1 1	23,57 24,21 24,21 22,79 23,10	26,52 (3 25,10 25,41	$\begin{array}{c} 5p\ ^4D^{\circ}-6d\ ^4P \\ P_2)\ 4f\ [1]^{\circ}-(^3P_2)\ 7g\ [2] \\ ^3P_2)\ 4f\ [1]^{\circ}-(^3P_2)\ 7g\ [2] \\ 4d\ ^4D-6p\ ^4D^{\circ} \\ 4d\ ^4F-(^3P_2)\ 5f\ [3]^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
5359,069 5358,616 5358,363 5354,82 5351,449	2 2 6 1 4	23,67 23,26 23,55 24,34 24,34	25,98 25,57 25,86 26,65 (3 26,65 (3	$\begin{array}{c} 5p \ ^2S^{\circ} - 6d \ ^2P \\ 4d \ ^2F - (^3P_1) \ 5f \ [3]^{\circ} \\ 4d \ ^2P - (^1D) \ 4f \ [1]^{\circ} \\ P_1) \ 4f \ [3]^{\circ} - (^3P_1) \ 7g \ [3] \\ P_4) \ 4f \ [3]^{\circ} - (^3P_1) \ 7g \ [4] \end{array}$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
5349,717 5348,604 5348,283 5345,609 5344,534	2 2 3 1 5	23,62 23,62 24,34 19,30 23,44	25,94 25,94 26,65 21,62 25,76	5p ² D°—6d ⁴ P 5p ² P°—6d ⁴ P P ₁) 4f [3]°—(³ P ₁) 7g [4] 4p ⁴ P°—3d′ ² P 5p ⁴ P°—6d ⁴ D	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
5339,33 5338,106 5335,916 5331,034 5330,664	1 1 1 4 3	23,12 23,48 24,19 24,19 22,77	25,44 25,80 26,51 (3, 26,52 (3, 25,10	$\begin{array}{c} 4d\ ^4P - (^3P_2)\ 5f\ [1]^\circ \\ 5p\ ^4D^\circ - 6d\ ^4F \\ P_2)\ 4f\ [5]^\circ - (^3P_2)\ 7g\ [5] \\ P_2)\ 4f\ [5]^\circ - (^3P_2)\ 7g\ [6] \\ 4d\ ^4D - 6p\ ^4D^\circ \end{array}$	3/2 - 3/2 $7/2 - 7/2$ $11/2 - 11/2$ $9/2 - 11/2$ $7/2 - 7/2$
5329,712 5315,214 5314,258 5312,002 5308,074	5 3 2 6 5	24,19 24,38 23,48 24,38 21,37	$\begin{array}{cccc} 26,71 & (^3I) \\ 25,82 & \end{array}$	P_{2}) $4f$ [5]°—($^{3}P_{2}$) $7g$ [6] P_{0}) $4f$ [3]°—($^{3}P_{0}$) $7g$ [4] $5p$ ^{4}P °— $7s$ ^{2}P P_{0}) $4f$ [3]°—($^{3}P_{0}$) $7g$ [4] $3d'$ ^{2}D — $5p$ ^{4}S °	$ \begin{array}{c} 11/_{2} - 13/_{2} \\ 5/_{2} - 7/_{2} \\ 1/_{2} - 3/_{2} \\ 7/_{2} - 9/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
5305,690 5300,761 354	6 { 4	24,18 19,97 24,31	26,51 (3 <i>I</i> 22,31	$(P_2) \frac{4f}{4p} \frac{[2]^{\circ} - (^3P_2)}{5^{\circ} - 3d'' \frac{^2}{2}I} \frac{7g}{5^{\circ} - 3d'' \frac{^2}{2}I} $ $(P_1) \frac{4f}{4} \frac{[4]^{\circ} - (^3P_1)}{7g} \frac{7g}{5} \frac{[5]}{5}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{9}{2}$

					
λ, Å	I	E _H , eV	E _B , eV	Transition	J
5299,075 5297,993 5296,791	3 3 3	23,62 23,62 23,89	25,96 25,96 26,23	5p ² D°—6d ² F 5p ² P°—6d ² F 4d ² D—(³ P ₁) 6f [2]°	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
5296,386 5295,892 5293,821 5290,035 5288,634	4 3 4 3 1	24,31 24,18 24,31 24,31 23,07	26,65 26,51 26,65 26,65 25,41	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 9/2 - 11/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array}$
5286,895 5285,438 5283,437 5281,628 5273,580	15 2 1 7 1	17,26 22,82 23,07 23,40 23,89	19,61 25,17 25,41 25,75 26,24	$4s^{2}P - 4p^{4}D^{\circ}$ $3d'^{2}S - 5p'^{2}P^{\circ}$ $4d^{4}F - (^{3}P_{2})^{5}f[3]^{\circ}$ $5p^{4}P^{\circ} - 6d^{4}D$ $4d^{2}D - (^{3}P_{1})^{6}f[3]^{\circ}$	$^{1}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{5}/_{2}$ $^{-7}/_{2}$ $^{5}/_{2}$ $^{-7}/_{2}$ $^{3}/_{2}$ $^{-5}/_{2}$
5269,755 5268,246 5267,958 5267,168 5264,783	4 3 3 6 6	23,44 24,16 24,16 23,40 23,55	25,79 26,51 26,51 25,76 25,90	$\begin{array}{c} 5p \ ^4P^{\circ} - 6d \ ^4D \\ (^3P_2) \ ^4f \ [3]^{\circ} - (^3P_2) \ ^7g \ [5] \\ (^3P_2) \ ^4f \ [3]^{\circ} - (^3P_2) \ ^7g \ [4] \\ 5p \ ^4P^{\circ} - 6d \ ^4D \\ 4d \ ^2P - (^1D) \ ^4f \ [2]^{\circ} \end{array}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $
5264,305 5261,903 5259,174 5258,223 5256,569	1 4 1 1 3	24,16 24,16 23,08 24,16 23,51	26,51 26,51 25,44 26,51 25,87	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	7/2 $5/2$ $7/2$ $5/2$ $1/2$ $1/2$ $1/2$ $5/2$ $5/2$ $5/2$
5255,677 5252,138 5251,400 5251,108 5249,547	1 1 3 3 4	22,81 23,26 24,15 24,15 23,48	25,17 $25,62$ $26,51$ $26,51$ $25,85$	$\begin{array}{c} 4d\ ^4D - 5p'\ ^2P^{\circ} \\ 4d\ ^2F - (^3P_0)\ 5f\ [3]^{\circ} \\ (^3P_2)\ 4f\ [4]^{\circ} - (^3P_2)\ 7g\ [5] \\ (^3P_2)\ 4f\ [4]^{\circ} - (^3P_2)\ 7g\ [4] \\ 5p\ ^4P^{\circ} - 6d\ ^4P \end{array}$	3/2 - 3/2 $5/2 - 7/2$ $7/2 - 9/2$ $1/2 - 1/2$
5247,986 5247,469 5245,389 5241,786 5236,853	3 1 5 2 1	23,87 24,15 24,15 23,58 23,62	26,23 26,51 26,51 25,94 25,98	$\begin{array}{c} 4d^{2}D - (^{3}P_{1}) \ 6f \ [4]^{\circ} \\ (^{3}P_{2}) \ 4f \ [4]^{\circ} - (^{3}P_{2}) \ 7g \ [3] \\ (^{3}P_{2}) \ 4f \ [4]^{\circ} - (^{3}P_{2}) \ 7g \ [5] \\ 5p \ ^{2}P^{\circ} - 6d \ ^{4}F \\ 5p \ ^{2}P^{\circ} - 6d \ ^{2}P \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5236,231 5235,564	$rac{2}{4}$	23,57	25,94 21,67	5p ⁴ D°—6d ⁴ P? ————————————————————————————————————	3/ ₂ ⁵ / ₂ 1/ ₂ ¹ / ₂
5230,523 5221,854 5219,589	$\frac{3}{3}$	23,68 21,43 22,84	26,05 23,80 25,21	5p 2D°—6d 2D 3d′ 2D—4p″ 2P° 4d 4D—6p 2D°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5216,816 5204,440 5202,201 5192,810 5191,364	8 3 2 3 4	$ \begin{array}{c} 21,50 \\ 23,44 \\ 21,49 \\ 23,58 \\ 22,82 \\ 23,48 \end{array} $	23,87 25,82 23,87 25,96 25,21 25,87	$4p' \ ^{2}D^{\circ}-4d \ ^{2}D$ $5p \ ^{4}P^{\circ}-7s \ ^{2}P$ $4p' \ ^{2}D^{\circ}-4d \ ^{2}D$ $5p \ ^{2}P^{\circ}-6d \ ^{2}D$ $3d' \ ^{2}S-6p \ ^{2}D^{\circ}$ $5p \ ^{4}P^{\circ}-6d \ ^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
5176,233 5175,426 5165,774 5162,742 5159,505	10 2 8 5 1	18,73 23,16 19,87 21,49 22,70	21,13 25,56 22,26 23,89 25,10	$\begin{array}{c} 3d\ ^{2}D-4p'\ ^{2}F^{\circ} \\ 4d\ ^{2}F-(^{3}P_{1})\ 5f\ [4]^{\circ} \\ 4p\ ^{2}P^{\circ}-3d''\ ^{2}D \\ 4p'\ ^{2}D^{\circ}-4d\ ^{2}D \\ 5s\ ^{2}P-6p\ ^{4}D^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5145,319 5141,790 5132,145 5131,106 5129,083	2	17,14 18,73 23,01 23,40 23,57	19,55 21,14 25,43 25,82 25,82	$5p {}^{4}P^{\circ} - 7s {}^{2}P$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{7}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $
5125,765 5122,972 5121,486	$\frac{2}{2}$	21,43 23,87	23,85 $ 26,29$	$3d' {}^{2}D - 4p'' {}^{2}P^{\circ}$ $- 4d {}^{2}D - ({}^{3}P_{0}) {}^{6}f [3]^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ - \\ 5/2 - 5/2 \end{array} $

λ, Ä	I	$E_{\rm II}$, eV	$E_{\rm B}$, eV	Transition	J
5096,851 5095,845	1 2	23,62 23,62	26,05 26,05	5p ² D°—6d ² D 5p ² P°—6d ² D	$\frac{5}{3}/2 - \frac{5}{2}$ $\frac{5}{2} - \frac{5}{2}$
5092,174 5090,496 5062,036 5059,394 5042,416	1 10 30 2 1	23,44 21,37 16,81 — 22,77	25,87 23,80 19,26 	$5p ^4P^{\circ} - 6d ^4F$ $3d' ^2D - 4p'' ^2P^{\circ}$ $4s ^4P - 4p ^4P^{\circ}$ $ 4d ^4D - 6p ^2D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ - \\ 7/2 - 5/2 \end{array} $
5024,778 5017,629 5017,160 5014,92 5009,334	1 10 20 1 30	21,43 17,14 18,66 23,63 16,75	23,89 19,61 21,13 26,10 19,22	$4p' \ ^{2}P^{\circ}-4d \ ^{2}D$ $4s \ ^{2}P-4p \ ^{4}D^{\circ}$ $3d \ ^{2}D-4p' \ ^{2}F^{\circ}$ $4d \ ^{2}P-(^{3}P_{2}) \ 6f \ [2]^{\circ}$ $4s \ ^{4}P-4p \ ^{4}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4996,782 4993,746 4972,157 4965,073 4959,478	2 2 15 25 1	22,95 23,57 16,81 17,26 23,44	25,43 26,05 19,30 19,76 25,94	$\begin{array}{c} 4d\ ^4F - (^3P_2)\ 5f\ [5]^{\circ} \\ 5p\ ^4D^{\circ} - 6d\ ^2D \\ 4s\ ^4P - 4p\ ^4P^{\circ} \\ 4s\ ^2P - 4p\ ^2D^{\circ} \\ 5p\ ^4P^{\circ} - 6d\ ^4P \end{array}$	$\begin{array}{c} 9/2 - 11/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
4955,111 4952,924 4949,398 4942,915 4936,083	7 2 5 6 3	21,67 17,14 19,76 19,80 18,62	24,18 19,64 22,26 22,31 21,13	$3d' {}^{2}P - ({}^{3}P_{2}) 4f [2]^{\circ}$ $4s {}^{2}P - 4p {}^{4}D^{\circ}$ $4p {}^{2}D^{\circ} - 3d'' {}^{2}D$ $4p {}^{2}P^{\circ} - 3d'' {}^{2}D$ $3d {}^{2}F - 4p' {}^{2}F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
4933,206 4914,309 4904,753 4889,033 4888,263	25 2 12 15 5	16,75 21,35 18,62 17,26 21,62	19,26 23,87 21,14 19,80 24,16	$4s ^4P - 4p ^4P^{\circ} \ 4p' ^2P^{\circ} - 4d ^2D \ 3d ^2F - 4p' ^2F^{\circ} \ 4s ^2P - 4p ^2P^{\circ} \ 3d' ^2P - (^3P_2) 4f [3]^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array}$
4882,233 4879,860 4867,557 4865,919 4856,156	10 30 5 12 1	21,67 17,14 19,76 19,97 21,62	24,21 19,68 22,31 22,51 24,18	$3d' {}^{2}P - ({}^{3}P_{2}) 4f [1]^{\circ}$ $4s {}^{2}P - 4p {}^{2}D^{\circ}$ $4p {}^{2}D^{\circ} - 3d' {}^{2}D$ $4p {}^{4}S^{\circ} - 5s {}^{4}P$ $3d' {}^{2}P - ({}^{3}P_{2}) 4f [2]^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
4847,815 4806,017 4792,090 4786,155 4764,862	25 35 6 5 25	16,75 16,64 19,68 21,62 17,26	19,30 19,22 22,26 24,21 19,87	$4s ^4P - 4p ^4P^{\circ} \ 4s ^4P - 4p ^4P^{\circ} \ 4p ^2D^{\circ} - 3d'' ^2D \ 3d' ^2P - (^3P_2) 4f [1]^{\circ} \ 4s ^2P - 4p ^2P^{\circ}$	$\begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array}$
4757,215 4735,905 4732,056 4730,664 4726,859	1 25 12 3 25	22,80 16,64 18,73 19,97 17,14	25,41 19,26 21,35 22,59 19,76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
4721,594 4710,823 4703,359 4682,277 4681,494	12 7 9 10 2	19,97 18,49 21,67 18,49 19,87	22,59 21,13 24,31 21,14 22,51	$4p {}^{4}S^{\circ} - 5s {}^{4}P$ $3d {}^{2}F - 4p' {}^{2}F^{\circ}$ $3d' {}^{2}P - ({}^{3}P_{1}) {}^{4}f [2]^{\circ}$ $3d {}^{2}F - 4p' {}^{2}F^{\circ}$ $4p {}^{2}P^{\circ} - 5s {}^{4}P$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{5}{2} $
4666,260 4657,893 4637,233 4614,10 4611,245	1 25 12 1 3	19,61 17,14 18,45 21,62 21,62	22,26 19,80 21,13 24,31 24,31	$4p ^4D^{\circ} - 3d'' ^2D$ $4s ^2P - 4p ^2P^{\circ}$ $4s' ^2D - 4p' ^2F^{\circ}$ $3d' ^2P - (^3P_4) 4f [2]^{\circ}$ $3d' ^2P - (^3P_4) 4f [2]^{\circ}$	3/2 - 5/2 $3/2 - 1/2$ $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 5/2$
4609,560 4600,02 4598,760 4589,896 4587,895	25 1 10 25 3	18,45 20,74 18,66 18,43 17,26	21,14 23,44 21,35 21,13 19,97	$4s' ^2D - 4p' ^2F^{\circ} \ 4s'' ^2S - 5p ^4P^{\circ} \ 3d ^2D - 4p' ^2P^{\circ} \ 4s' ^2D - 4p' ^2F^{\circ} \ 4s ^2P - 4p ^4S^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
4579,346 4572,894	$\begin{array}{c} 25 \\ 2 \end{array}$	17,26 19,97	19,97 22,68	4s ² P—4p ² S° 4p ² S°—5s ⁴ P	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

λ, Δ	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
4564,415 7 4563,751 7 4561,018 3	21,62	22,68 24,34 22,26	4p 4S°-5s 4P 3d′ 2P-(3P ₁) 4f [3]° 4p 4D°-3d″ 2D	3/2 - 1/2 $3/2 - 5/2$ $5/2 - 5/2$
4547,760 4 4545,045 25 4543,871 3 4538,713 1 4537,648 7	17,14 19,97 21,14	22,59 19,87 22,70 23,87 24,16	4p ² P°-5s ⁴ P 4s ² P-4p ² P° 4p ² S°-5s ² P 4p' ² F°-4d ² D 3d' ² D-(³ P ₂) 4f [3]°	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \end{array}$
4535,492 6 4530,553 7 4517,526 3 4516,095 1 4509,957 2	$18,62 \\ 20,74 \\ 22,51$	22,70 21,35 23,48 25,26 24,18	$4p^{4}S^{\circ}-5s^{2}P$ $3d^{2}F-4p'^{2}P^{\circ}$ $4s''^{2}S-5p^{4}P^{\circ}$ $5s^{4}P-6p^{2}P^{\circ}$ $3d'^{2}D-(^{3}P_{2})^{4}f^{[2]^{\circ}}$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
4503,08 1 4502,931 7 4498,543 7 4490,988 8 4481,810 15	21,43 21,62 3 18,73	22,51 24,18 24,38 24,49 21,50	4p ² D°-5s ⁴ P 3d' ² D-(³ P ₂) 4f [2]° 3d' ² P-(³ P ₀) 4f [3]° 3d ² D-4p' ² D° 3d ² D-4p' ² D°	$ \begin{array}{r} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
4474,759 10 4460,560 12 4458,885 1 4456,55 1 4449,517 4	$ \begin{array}{ccc} 16,44 \\ 23,08 \\ 23,16 \end{array} $	21,43 19,22 25,86 25,94 24,21	3d ² D-4p' ² P° 3d ⁴ D-4p ⁴ P° 4d ⁴ P-(¹ D) 4f [1]° 4d ² F-(¹ D) 4f [3]° 3d' ² D-(³ P ₂) 4f [1]°	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
4445,848 4440,122	3 21,50 4 21,37	24,28 24,28 24,15 22,59 24,28	$4p' \ ^2D^{\circ} - 5s' \ ^2D$ $4p' \ ^2D^{\circ} - 5s' \ ^2D$ $3d' \ ^2D - (^3P_2) \ 4f \ [4]^{\circ}$ $4p \ ^2P^{\circ} - 5s \ ^4P$ $4p' \ ^2D^{\circ} - 5s' \ ^2D$	$\begin{array}{c} 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array}$
4438,808		24,28 25,95 24,16 24,16 19,22	4p' 2D°-5s' 2D 4d 2F-(1D) 4f [4]° 3d' 2D-(3P ₂) 4f [3]° 3d' 2D-(3P ₂) 4f [3]° 3d 4D-4p 4P°	3/2 - 3/2 $7/2 - 9/2$ $5/2 - 5/2$ $5/2 - 7/2$ $5/2 - 5/2$
4430,192 20 4426,005 25 4420,912 12 4412,905 4406,469 2	5 16,75	19,61 19,55 19,26 21,14 26,32	$4s ^4P - 4p ^4D^{\circ}$ $4s ^4P - 4p ^4D^{\circ}$ $3d ^4D - 4p ^4P^{\circ}$ $3d ^4P - 4p' ^2F^{\circ}$ $5p ^4D^{\circ} - 7d ^4F$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 7/_{2} \end{array} $
4401,744 2 4400,988 20 4400,099 18		24,18 22,68 19,22 19,26 22,79	$3d' ^{2}D - (^{3}P_{2}) ^{4}f [2]^{\circ}$ $4p ^{2}P^{\circ} - 5s ^{4}P$ $3d ^{4}D - 4p ^{4}P^{\circ}$ $3d ^{4}D - 4p ^{4}P^{\circ}$ $4p ^{4}S^{\circ} - 4d ^{4}D$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
4386,962 4385,058 4383,754 4382,934 4379,879	20,74	26,44 23,57 19,97 26,31 22,80	$5p ^2D^{\circ} - 7d ^2F?$ $4s'' ^2S - 5p ^4D^{\circ}$ $4s ^2P - 4p ^4S^{\circ}$ $5p ^4D^{\circ} - 7d ^4F$ $4p ^2S^{\circ} - 5s ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4379,667 20 4379,226 3 4375,948 12 4374,857 6	3 19,76	19,64 22,59 19,97 22,70 22,51	$4s ^4P - 4p ^4D^{\circ}$ $4p ^2D^{\circ} - 5s ^4P$ $4s ^2P - 4p ^2S^{\circ}$ $4p ^2P^{\circ} - 5s ^2P$ $4p ^2D^{\circ} - 5s ^4P$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
4371,329 20 4370,751 13 4367,829 10 4362,065 10	16,42 5 18,66 0 20,74	19,26 21,49 23,58 21,50 22,81	$3d ^4D - 4p ^4P^{\circ}$ $3d ^2D - 4p' ^2D^{\circ}$ $4s'' ^2S - 5p ^2P^{\circ}$ $3d ^2D - 4p' ^2D^{\circ}$ $4p ^4S^{\circ} - 4d ^4D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{_{ m H}},\;{ m eV}$	$E_{_{ m B}}$, eV	Transition	J
4352,204 4348,063 4338,228 4337,070 4332,031	15 50 2 8 15	16,46 16,64 19,97 21,43 16,44	19,30 19,49 22,82 24,28 19,30	$3d\ ^4D-4p\ ^4P^\circ \ 4s\ ^4P-4p\ ^4D^\circ \ 4p\ ^4S^\circ-3d'\ ^2S \ 4p'\ ^2P^\circ-5s'\ ^2D \ 3d\ ^4D-4p\ ^4P^\circ$	$^{1}/_{2}$ $^{-1}/_{2}$ $^{5}/_{2}$ $^{-7}/_{2}$ $^{3}/_{2}$ $^{-1}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-1}/_{2}$
4331,199 4319,636 4309,236 4309,090 4300,650	25 2 9 8 12	16,75 19,97 20,74 18,62 18,62	19,61 22,84 23,62 21,49 21,50	$4s ^4P - 4p ^4D^\circ \ 4p ^4S^\circ - 4d ^4D^? \ 4s'' ^2S - 5p ^2P^\circ \ 3d ^2F - 4p' ^2D^\circ \ 3d ^2F - 4p' ^2D^\circ \ $	3/2 - 3/2 $3/2 - 1/2$ $1/2 - 3/2$ $5/2 - 3/2$ $5/2 - 5/2$
4300,449 4297,964 4286,343 4282,896 4279,909	2 7 2 12 2	21,43 21,43 23,40 16,75	24,31 24,31 26,29 19,64	$3d' {}^{2}D - ({}^{3}P_{1}) 4f [2]^{\circ}$ $3d' {}^{2}D - ({}^{3}P_{1}) 4f [2]^{\circ}$ $5p {}^{4}P^{\circ} - 7d {}^{4}D$ $4s {}^{4}P - 4p {}^{4}D^{\circ}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{1}{2} $
4277,524 4275,158 4267,730 4267,490 4266,528	20 8 3 3 25	18,45 19,80 20,74 19,61 16,64	21,35 22,70 23,65 22,51 19,55	$4s' ^{2}D - 4p' ^{2}P^{\circ}$ $4p ^{2}P^{\circ} - 5s ^{2}P$ $4s'' ^{2}S - 5p ^{4}D^{\circ}$ $4p ^{4}D^{\circ} - 5s ^{4}P$ $4s ^{4}P - 4p ^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
4256,663 4255,600 4243,640 4237,223 4229,872	1 4 2 12 8	21,43 19,68 19,87 18,43 20,74	24,34 22,59 22,79 21,35 23,67	$3d' {}^{2}D$ — $({}^{3}P_{1}) 4f [3]^{\circ}$ $4p {}^{2}D^{\circ}$ — $5s {}^{4}P$ $4p {}^{2}P^{\circ}$ — $4d {}^{4}D$ $4s' {}^{2}D$ — $4p' {}^{2}P^{\circ}$ $4s'' {}^{2}S$ — $5p {}^{2}S^{\circ}$	$ \begin{array}{r} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
4228,162 4226,988 4226,607 4222,640 4218,667	20 10 5 10 11	16,75 21,35 21,35 19,87 19,76	19,68 24,28 24,28 22,80 22,70	$\begin{array}{c} 4s{}^{4}P - 4p{}^{2}D^{\circ} \\ 4p'{}^{2}P^{\circ} - 5s'{}^{2}D \\ 4p'{}^{2}P^{\circ} - 5s'{}^{2}D \\ 4p{}^{2}P^{\circ} - 5s{}^{2}P \\ 4p{}^{2}D^{\circ} - 5s{}^{2}P \end{array}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{3}{2} $
4217,433 4214,854 4210,950 4209,944 4203,410	9 2 1 1 11	20,74 23,16 21,37 19,87 21,37	23,68 26,10 24,31 22,81 24,31	$4s'' ^2S - 5p ^2D^{\circ}$ $4d ^2F - (^3P_2) 6f [5]^{\circ}$ $3d' ^2D - (^3P_1) 4f [2]^{\circ}$ $4p ^2P^{\circ} - 4d ^4D$ $3d' ^2D - (^3P_1) 4f [4]^{\circ}$	$^{1/2}_{-2}^{-3/2}_{-3/2}$ $^{7/2}_{-2}^{-9/2}_{-3/2}$ $^{5/2}_{-3/2}^{-3/2}_{-3/2}$ $^{5/2}_{-7/2}^{-7/2}$
4201,971 4201,551 4199,892 4189,653 4179,302	$ \begin{array}{c} 12 \\ 4 \\ 6 \\ 10 \\ 12 \end{array} $	16,81 19,64 21,43 20,74 19,55	19,76 22,59 24,38 23,70 22,51	$4s^4P - 4p^2D^\circ$ $4p^4D^\circ - 5s^4P$ $3d'^2D - (^3P_0)^4f^[3]^\circ$ $4s''^2S - 5p^4S^\circ$ $4p^4D^\circ - 5s^4P$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
4178,371 4168,967 4156,090 4147,377 4144,240	12 4 12 2 1	16,64 21,37 19,61 16,81 23,67	19,61 24,34 22,59 19,80 26,66	$4s ^4P - 4p ^4D^{\circ}$ $3d' ^2D - (^3P_4) 4f [3]^{\circ}$ $4p ^4D^{\circ} - 5s ^4P$ $4s ^4P - 4p ^2P^{\circ}$ $5p ^2S^{\circ} - 5s'' ^2S$	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \end{array}$
4131,730 4129,693 4128,643 4124,058 4116,377	15 4 9 1 6	18,43 19,80 18,49 19,26 21,37	21,43 22,80 21,50 22,26 24,38	$\begin{array}{c} 4s' ^{2}D-4p' ^{2}P^{\circ} \\ 4p ^{2}P^{\circ}-5s ^{2}P \\ 3d ^{2}F-4p' ^{2}D^{\circ} \\ 4p ^{4}P^{\circ}-3d'' ^{2}D \\ 3d' ^{2}D-(^{3}P_{0}) 4f [3]^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4114,487 4112,819 4103,913 4099,458	2 8 20 2	$ \begin{array}{c} 21,37\\ 16,75\\ 19,49\\ 19,68\\ 19,80\\ 22,84 \end{array} $	24,38 19,76 22,51 22,70 22,82	$3d' {}^{2}D - ({}^{3}P_{0}) 4f [3]^{\circ}$ $4s {}^{4}P - 4p {}^{2}D^{\circ}$ $4p {}^{4}D^{\circ} - 5s {}^{4}P$ $4p {}^{2}D^{\circ} - 5s {}^{2}P$ $4p {}^{2}P^{\circ} - 3d' {}^{2}S$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/1 - 1/2 \end{array} $
4097,190 4097,138 4082,393 358	1 3 15	22,84 22,84 16,64	25,86 25,86 19,68	4d 4D-(1D) 4f [1]° 4d 4D-(1D) 4f [1]° 4s 4P-4p 2D°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
4080,686 4080,645 4079,582	4 6 12	22,82 22,82 18,45	25,86 25,86 21,49	3d' 2S—(1D) 4f [1]° 3d' 2S—(1D) 4f [1]° 4s' 2D—4p' 2D°	$^{1/_{2}-^{1}/_{2}}_{^{1/_{2}-^{3}/_{2}}}$ $^{5/_{2}-^{3}/_{2}}$
4076,939 4076,638 4072,385 4072,006 4070,789	9 12 12 25 2	19,76 19,64 19,55 18,45 23,62	22,80 22,68 22,59 21,50 26,66	$4p \ ^2D^{\circ} - 5s \ ^2P$ $4p \ ^4D^{\circ} - 5s \ ^4P$ $4p \ ^4D - 5s \ ^4P$ $4s' \ ^2D - 4p' \ ^2D^{\circ}$ $5p \ ^2P^{\circ} - 5s'' \ ^2S$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
4065,113 4057,672 4053,540 4052,923 4047,480	4 1 1 12 1	19,76 16,81 19,64 20,74 19,76	22,81 19,87 22,70 23,80 22,82	$4p \ ^2D^{\circ}$ $-4d \ ^4D$ $4s \ ^4P$ $-4p \ ^2P^{\circ}$ $4p \ ^4D^{\circ}$ $-5s \ ^2P$ $4s'' \ ^2S$ $-4p'' \ ^2P^{\circ}$ $4p \ ^2D^{\circ}$ $-3d' \ ^2S$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
4045,677 4042,896 4042,190 4038,807 4035,459	2 15 3 15 12	18,29 18,43 18,06 16,42 18,43	21,35 21,49 21,13 19,49 21,50	$3d\ ^4P-4p'\ ^2P^\circ \ 4s'\ ^2D-4p'\ ^2D^\circ \ 3d\ ^2P-4p'\ ^2F^\circ \ 3d\ ^4D-4p\ ^4D^\circ \ 4s'\ ^2D-4p'\ ^2D^\circ$	3/2 - 3/2 $3/2 - 3/2$ $3/2 - 5/2$ $5/2 - 7/2$ $3/2 - 5/2$
4033,818 4031,378 4019,843 4013,858 4011,202	12 2 2 25 6	19,61 19,76 23,58 16,41 19,61	22,68 22,84 26,66 19,49 22,70	$4p ^4D^{\circ} - 5s ^4P$ $4p ^2D^{\circ} - 4d ^4D$ $5p ^2P^{\circ} - 5s'' ^2S$ $3d ^4D - 4p ^4D^{\circ}$ $4p ^4D^{\circ} - 5s ^2P$	3/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $1/2 - 1/2$ $7/2 - 7/2$ $3/2 - 3/2$
4007,632 4005,362 4001,135 3999,248 3994,789	2 2 1 1 10	19,68 23,57 18,25 22,31 20,74 19,97	22,77 26,66 21,35 25,41 23,85 23,07	$4p \ ^2D^{\circ}-4d \ ^4D$ $5p \ ^4D^{\circ}-5s'' \ ^2S$ $3d \ ^4P-4p' \ ^2P^{\circ}$ $3d'' \ ^2D-6p \ ^2S^{\circ}$ $4s'' \ ^2S-4p'' \ ^2P^{\circ}$ $4p \ ^4S^{\circ}-4d \ ^4F?$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
3992,053 3988,158 3979,356 3974,753 3974,478	12 9 12 9 10	16,44 19,68 19,97 16,64 16,75	19,55 22,79 23,08 19,76 19,87	$3d\ ^4D-4p\ ^4D^\circ \ 4p\ ^2D^\circ-4d\ ^4D \ 4p\ ^4S^\circ-4d\ ^4P \ 4s\ ^4P-4p\ ^2D^\circ \ 4s\ ^4P-4p\ ^2P^\circ$	$\begin{array}{c} 3/_2 - 5/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \end{array}$
3968,360 3958,382 3952,729 3946,096 3944,272	20 6 9 12 15	16,42 19,68 19,97 21,14 16,41	19,55 22,81 23,10 24,28 19,55	$3d\ ^4D-4p\ ^4D^{\circ}\ 4p\ ^2D^{\circ}-4d\ ^4D\ ^4p\ ^4S^{\circ}-4d\ ^4F\ ^4p'\ ^2F^{\circ}-5s'\ ^2D\ 3d\ ^4D-4p\ ^4D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \end{array}$
3938,843 3935,275 3933,17 3932,548 3931,235	1 1 2 15 12	19,97 22,26 19,55 19,97 16,46	23,12 25,41 22,70 23,12 19,61	4p 2S°-4d 4P 3d" 2D-(3P ₂) 5f [3]° 4p 4D°-5s 2P 4p 4S°-4d 4P 3d 4D-4p 4D°	$ \begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 7/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \end{array} $
3928,629 3926,03 3925,722 3923,556 3922,528	25 7 10 1 1	16,81 21,13 21,13 23,48 19,64	19,97 24,28 24,28 26,64 22,80	$4s ^4P - 4p ^4S^{\circ}$ $4p' ^2F^{\circ} - 5s' ^2D$ $4p' ^2F^{\circ} - 5s' ^2D$ $5p ^4D^{\circ} - 8d ^4F$ $4p ^4D^{\circ} - 5s ^2P$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 5/_2 - 3/_2 \\ 7/_2 - 9/_2 \\ 1/_2 - 1/_2 \end{array} $
3922,359 3917,766 3914,768 3911,572 3900,624	2 4 12 10 11	16,81 18,33 16,44 19,64	19,97 21,50 19,61 28,81 22,79	$4s^{4}P - 4p^{2}S^{\circ}$ $3d^{4}P - 4p'^{2}D^{\circ}$ $3d^{4}D - 4p^{4}D^{\circ}$ $4p^{4}D^{\circ} - 4d^{4}D$ $4p^{4}D^{\circ} - 4d^{4}D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
3895,250 3891,984 3891,400 3880,335 3875,264	1 15 12 6 12	19,64 16,42 16,46 19,64 16,44	22,82 19,61 19,64 22,84 19,64	$4p ^4D^{\circ} - 3d' ^2S$ $3d ^4D - 4p ^4D^{\circ}$ $3d ^4D - 4p ^4D^{\circ}$ $4p ^4D^{\circ} - 4d ^4D$ $3d ^4D - 4p ^4D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array} $

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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	λ. Α	I	E _H , eV	E _B , eV	Transition	J
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3872,143			22,81		3/2-3/2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						$\frac{3}{2}$ $\frac{5}{2}$
$\begin{array}{llllllllllllllllllllllllllllllllllll$					$3d$ 4P — $4p'$ $^2D^{\circ}$	$^{3}/_{2}$ $-^{5}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		1			•	$^{3}/_{2}$ — $^{1}/_{2}$
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3841,518	6	19,61	22,84	4p 4D°—4d 4D	$3/2_{2}^{-1}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						5/2—7/2 3/1/-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				19,68	$3d^{4}D - 4p^{2}D^{\circ}$	$\frac{\frac{72}{3}}{\frac{5}{2}}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						$^{3}/_{2}$ — $^{3}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3823,254	3	20,27	23,51	$3d' {}^{2}F - 5p {}^{4}D^{\circ}$	$^{7}/_{2}^{-}$ $^{-5}/_{2}^{-}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	•			·	•	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3808,577	11	16,42	19,68	$\hat{3}d~^4D$ — $4p~^2D^\circ$	$\frac{5}{2}$ $\frac{5}{2}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						- · -
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3793,226	1	20,24	23,51	$3d' {}^2F$ — $5p {}^4D^\circ$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$4p ^4D - 4p ^2D$ $4p ^4D \circ - 4d ^4D$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	529, 3777	2			$4p^{2}P^{\circ}-4d^{4}P$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					$4p' {}^{2}D^{\circ} - 5d {}^{4}D$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3766,118	11			3d 2P-4p' 2P°	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					•	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	671, 3756	4	21,49	24,79	$4p' {}^{2}D^{\circ} - 5d {}^{4}D$	$^{3}/_{2}$ — $^{5}/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			21,43 (19,80	24,73 $23,40$	$4p' ^{2}P^{\circ} - 4d' ^{2}P$	$\frac{1}{2} - \frac{1}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			\ 21,49	24,79	$4p' {}^{2}D^{\circ} - 4d' {}^{2}D$	$3/_{2}$ $-3/_{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		2 5				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3746,915	5	19,76	23,07	$4p ^{2}D^{\circ} - 4d ^{4}F$	$3/_{2}^{-}$ $-5/_{2}^{-}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				$24,80 \\ 25,62$		$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		15			• • • •	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3735,495	6	$\left\{\begin{array}{c} 21,49 \\ 46,44 \end{array}\right\}$			$\frac{3}{2}$ $\frac{1}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3729,310	30	16,64			$\frac{3}{2}$ $\frac{-3}{2}$ $\frac{5}{2}$ $\frac{-3}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				24,82	$4p' {}^{2}D^{\circ} - 4d' {}^{2}F$	$^{5/_{2}}$ $-^{5/_{2}}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$					•	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3717, 174	10	19,68	23,01	$4p~^2D^{\circ}$ $-4d~^4F$	$\frac{5}{2}$ $\frac{7}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		6		19,76	$3d ^4D - 4p ^2D^{\circ}$	⁵ / ₂ — ³ / ₂
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3709,918			23,10	$4p^{-1}P - 0s^{-1}P$ $4p^{-2}D^{\circ} - 4cl^{-4}F$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
(2/3)					3d 4D-4p 2P°	1/2-1/2
	3703,550 360	1	23,16	25,51	$4d {}^{2}F$ — $({}^{3}P_{2})7f [5]^{\circ}$	⁷ / ₂ — ⁹ / ₂

		<u> </u>	. <u> </u>		
λ, Α	I	E _H , eV	EB, eV	Transition	J
3702,005 3694,643 3692,126	$\frac{2}{2}$	20,27 21,49 19,76	23,62 24,84 23,12	$3d' {}^{2}F - 5p {}^{2}D^{\circ} \ 4p' {}^{2}D^{\circ} - 5d {}^{4}D \ 4p {}^{2}D^{\circ} - 4d {}^{4}P$	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3682,547 3680,064 3678,274 3673,266 3671,005	7 9 10 5 4	18,06 21,43 19,22 21,43 21,35	21,43 24,79 22,59 24,80 24,73	$3d^{2}P-4p'^{2}P^{\circ}$ $4p'^{2}P^{\circ}-4d'^{2}D$ $4p^{4}P^{\circ}-5s^{4}P$ $4p'^{2}P^{\circ}-6s^{2}P$ $4p'^{2}P^{\circ}-4d'^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3669,605 3660,439 3657,218 3656,051 3655,281	$9 \\ 10 \\ 2 \\ 10 \\ 12$	19,30 21,35 21,43 19,68 19,87	22,68 24,74 24,81 23,07 23,26	$4p ^4P^{\circ} - 5s ^4P$ $4p' ^2P^{\circ} - 4cl' ^2P$ $4p' ^2P^{\circ} - 5d ^4D$ $4p ^2D^{\circ} - 4d ^4F$ $4p ^2P^{\circ} - 4d ^2F$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3650,891 3639,830 3637,031 3635,636 3634,814	7 12 10 3 7	19,30 21,35 21,50 19,76 19,94	22,70 24,76 24,90 23,17 21,35	$4p ^4P^{\circ} - 5s ^2P$ $4p' ^2P^{\circ} - 4d' ^2D$ $4p' ^2D^{\circ} - 5d ^4F$ $4p ^2D^{\circ} - 4d ^4P$ $3d ^2P - 4p' ^2P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3623,444 3622,140 3621,012 3620,807 3611,812	2 12 3 3 5	21,43 19,26 16,44 19,68 18,06	24,84 22,68 19,87 23,10 21,49	$4p' ^{2}P^{\circ} - 5d ^{4}D$ $4p ^{4}P^{\circ} - 5s ^{4}P$ $3d ^{4}D - 4p ^{2}P^{\circ}$ $4p ^{2}D^{\circ} - 4d ^{4}F$ $3d ^{2}P - 4p' ^{2}D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3611,365 3607,401 3605,883 3603,905 3603,462	1 2 12 4 4	21,49 20,24 18,06 19,26 19,68 19,64	24,92 23,68 21,50 22,70 23,12 23,08	$4p' ^{2}D^{\circ} - 5d ^{4}P$ $3d' ^{2}F - 5p ^{2}D^{\circ}$ $3d ^{2}P - 4p' ^{2}D^{\circ}$ $4p ^{4}P^{\circ} - 5s ^{2}P$ $4p ^{2}D^{\circ} - 4d ^{4}P$ $4p ^{4}D^{\circ} - 4d ^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
3601,512 3600,219 3588,448 3582,362 3581,608	4 3 30 20 18	16,42 21,35 19,49 19,61 19,64	19,87 24,79 22,95 23,07 23,10	$3d ^4D - 4p ^2P^{\circ}$ $4p' ^2P^{\circ} - 4d' ^2D$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^4D^{\circ} - 4d ^4F$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3578,357 3576,611 3575,761 3570,746 3569,940	5 25 1 1 3	21,35 19,55 21,50 21,49 { 19,61 21,49	24,81 23,01 24,96 24,96 23,08 24,96	$4p' \ ^2P^\circ -5d \ ^4D$ $4p \ ^4D^\circ -4d \ ^4F$ $4p' \ ^2D^\circ -5d \ ^4F$ $4p' \ ^2D^\circ -5d \ ^4P$ $4p \ ^4D^\circ -4d \ ^4P$ $4p' \ ^2D^\circ -5d \ ^4F$	3/2 - 3/2 $5/2 - 7/2$ $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 1/2$ $3/2 - 5/2$
3565,033 3564,33 3562,194 3561,031 3559,508	12 7 7 20 25	19,64 19,22 21,14 21,14 19,68	23,12 22,70 24,62 24,62 23,16	$4p ^4D^{\circ} - 4d ^4P$ $4p ^4P^{\circ} - 5s ^2P$ $4p' ^2F^{\circ} - 4d' ^2G$ $4p' ^2F^{\circ} - 4d' ^2G$ $4p ^2D^{\circ} - 4d ^2F$	$1/_2$ $3/_2$ $5/_2$ $3/_2$ $7/_2$ $7/_2$ $9/_2$ $5/_2$ $7/_2$
3556,906 3550,030 3548,519 3545,842 3545,597	7 5 15 18 18	17,94 19,68 19,61 21,13 19,76	21,43 23,17 23,10 24,62 23,26	$3d^{2}P-4p'^{2}P^{\circ}$ $4p^{2}D^{\circ}-4d^{4}P$ $4p^{4}D^{\circ}-4d^{4}F$ $4p'^{2}F^{\circ}-4d'^{2}G$ $4p^{2}D^{\circ}-4d^{2}F$	$ \begin{array}{c} 1/_2 - 1/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 7/_2 \\ 3/_2 - 5/_2 \end{array} $
3543,149 3535,319 3532,233 3531,178 3521,977	7 18 1 2 4	21,50 19,30 19,61 16,46 19,30	24,99 22,81 23,12 19,97 22,82	$4p'\ ^2D^\circ-5d\ ^2F$ $4p\ ^4P^\circ-4d\ ^4D$ $4p\ ^4D^\circ-4d\ ^4P$ $3d\ ^4D-4p\ ^4S^\circ$ $4p\ ^4P^\circ-3d'\ ^2S$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
3521,555 3521,263 3519,996	1 12 15	21,50 19,49 19,55	25,02 23,01 23,07	4p' 2D°—5d 4P 4p 4D°—4d 4F 4p 4D°—4d 4F	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \end{array} $ 361

λ, Å	I	E _{II} , eV	E _B , eV	Transition	J
3517,894 3514,388	6 20	16,44 19,26	19,97 22,79	3d ⁴ D-4p ⁴ S° 4p ⁴ P°-4d ⁴ D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3509,783 3499,481 3495,775 3491,538 3491,243	10 7 1 25 20	19,30 16,42 21,62 19,22 19,26	22,84 19,97 25,17 22,77 22,81	$4p ^4P^{\circ}$ — $4d ^4D$ $3d ^4D$ — $4p ^4S^{\circ}$ $3d' ^2P$ — $5p' ^2P^{\circ}$ $4p ^4P^{\circ}$ — $4d ^4D$ $4p ^4P^{\circ}$ — $4d ^4D$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
3490 ,884 3488 ,188 3487 ,318 3480 ,511 3478 ,236	8 1 3 9 5	17,94 22,31 19,55 19,61 19,26	21,49 25,86 23,10 23,17 22,82	3d ² P-4p' ² D° 3d" ² D-(¹ D) 4f [1]° 4p ⁴ D°-4d ⁴ F 4p ⁴ D°-4d ⁴ P 4p ⁴ P°-3d' ² S	1/2 - 3/2 $3/2 - 1/2$ $5/2 - 3/2$ $3/2 - 5/2$ $3/2 - 1/2$
3476,749 3471,600 3470,264 3466,343 3465,787	20 3 4 8 4	19,22 19,55 21,49 { 19,49 19,26 19,97	22,79 23,12 25,06 23,07 22,84 23,55	$4p ^4P^{\circ} - 4d ^4D$ $4p ^4D^{\circ} - 4d ^4P$ $4p' ^2D^{\circ} - 5d ^2F$ $4p ^4D^{\circ} - 4d ^4F$ $4p ^4P^{\circ} - 4d ^4D$ $4p ^2S^{\circ} - 4d ^2P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
3464,132 3454,098 3448,281 3447,290 3439,094	10 12 1 1	19,68 19,22 22,31 22,26 23,55	23,26 22,81 25,90 25,86 27,15	4p ² D°-4d ² F 4p ⁴ P°-4d ⁴ D 3d" ² D-(¹ D) 4f [2]° 3d" ² D-(¹ D) 4f [1]° 4d ² P-(¹ D) 5f [2]°	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3435,773 3433,369 3432,585 3431,737 3430,990	1 1 3 2 3	21,67 23,16 21,13 21,35 21,35	25,28 26,77 24,74 24,96 24,96	3d' ² P-6p ⁴ S° 4d ² F-(³ P ₂) 8f [5]° 4p' ² F°-4d' ² P 4p' ² P°-5d ⁴ P 4p' ² P°-5d ⁴ F	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3430,417 3429,617 3421,615 3416,560 3414,462	9 7 8 1 4	19,55 21,14 19,55 23,01 21,13	23,16 24,76 23,17 26,64 24,76	$4p^{4}D^{\circ}-4d^{2}F$ $4p'^{2}F^{\circ}-4d'^{2}D$ $4p^{4}D^{\circ}-4d^{4}P$ $4d^{4}F-(^{3}P_{1})^{7}f[4]^{\circ}$ $4p'^{2}F^{\circ}-4d'^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3409,699 3409,413 3408,612 3406,298 3397,900	2 1 2 3 5	22,31 22,26 22,26 21,14 19,61	25,94 25,90 25,90 24,78 23,26	3d" ² D-(¹ D) 4f [3]° 3d" ² D-(³ P ₂) 7p [2]° 3d" ² D-(¹ D) 4f [2]° 4p' ² F°-5d ⁴ D 4p ⁴ D°-4d ² F	$\begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ \hline 5/2 - 5/2 \\ \hline 7/2 - 7/2 \\ 3/2 - 5/2 \end{array}$
3397,608 3397,002 3388,533 3383,865 3382,133	1 1 10 1 3	21,43 21,14 19,97 19,97 21,13	25,07 24,79 23,63 23,63 24,79	$3d' ^{2}D - 6p ^{4}P^{\circ}$ $4p' ^{2}F^{\circ} - 5d ^{4}D$ $4p ^{2}S^{\circ} - 4d ^{2}P$ $4p ^{4}S^{\circ} - 4d ^{2}P$ $4p' ^{2}F^{\circ} - 5d ^{4}D$	$\begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array}$
3381,063 3379,577 3379,458 3378,442 3376,443	1 4 4 1 12	21,35 21,13 19,49 21,43 21,14	25,02 24,79 23,16 25,10 24,81	$4p'\ ^2P^{\circ}-5d\ ^4P$ $4p'\ ^2F^{\circ}-4d'\ ^2D$ $4p\ ^4D^{\circ}-4d\ ^2F$ $3d'\ ^2D-6p\ ^4P^{\circ}$ $4p'\ ^2F^{\circ}-4d'\ ^2F$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{7}{2} - \frac{7}{2} $
3373,842 3370,925 3366,586 3365,536 3364,362	3 8 6 8 2	$ \begin{array}{c} 21,13 \\ 22,26 \\ 19,49 \\ 19,87 \\ 21,14 \\ 21,43 \end{array} $	24,80 25,94 23,17 23,55 24,82 25,11	$4p'\ ^2F^\circ - 6s\ ^2P$ $3d''\ ^2D - (^1D)\ 4f\ [3]^\circ$ $4p\ ^4D^\circ - 4d\ ^4P$ $4p\ ^2P^\circ - 4d\ ^2P$ $4p'\ ^2F^\circ - 4dl'\ ^2F$ $3d'\ ^2D - 6p\ ^4D^\circ$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3363,300 3361,752 3350,933 3347,694 3341,746	$\begin{array}{c} 2 \\ 6 \\ 12 \\ 1 \\ 6 \end{array}$	21,62 21,13 21,13 21,14 19,55	25,31 24,81 24,82 24,84 23,26	$3d' {}^{2}P - 5p' {}^{2}D^{\circ}$ $4p' {}^{2}F^{\circ} - 4d' {}^{2}F$ $4p' {}^{2}F^{\circ} - 4d' {}^{2}F$ $4p' {}^{2}F^{\circ} - 5d {}^{4}F$ $4p {}^{4}D^{\circ} - 4d {}^{2}F$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3341,507 3338,828 3337,116 3324,228 3320,375	3 5 2 2 2	21,37 21,35 22,79 22,77 21,67	25,07 25,06 26,50 26,50 25,41	$3d' ^{2}D-6p ^{4}P^{\circ}$ $4p' ^{2}P^{\circ}-5d ^{2}F$ $4d ^{4}D-(^{3}P_{2}) 7f [4]^{\circ}$ $4d ^{4}D-(^{3}P_{2}) 7f [4]^{\circ}$ $3d' ^{2}P-6p ^{2}S^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3317,825 3312,936 3309,343 3307,229 3306,445	3 3 5 9 5	21 ,37 21 ,37 21 ,37 19 ,80 21 ,67	25,10 25,11 23,55 25,42	$3d' ^{2}D - 6p ^{4}D^{\circ}$ $- 3d' ^{2}D - 6p ^{4}D^{\circ}$ $4p ^{2}P^{\circ} - 4d ^{2}P$ $3d' ^{2}P - (^{3}P_{2}) 5f [2]^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3298,418 3297,020 3293,921 3293,641 3291,441	$\begin{array}{c} 2 \\ 2 \\ 9 \\ 10 \\ 6 \end{array}$	23,01 21,43 21,14 19,87 21,67	26,77 25,19 24,90 23,63 25,44	$\begin{array}{c} 4d\ ^{4}F-(^{3}P_{2})\ 8f\ [5]^{\circ} \\ 3d'\ ^{2}D-5p'\ ^{2}F^{\circ} \\ 4p'\ ^{2}F^{\circ}-5d\ ^{4}F \\ 4p\ ^{2}P^{\circ}-4d\ ^{2}P \\ 3d'\ ^{2}P-(^{3}P_{2})\ 5f\ [1]^{\circ} \end{array}$	$\frac{7}{2}$
3281 ,703 3279 ,937 3276 ,085 3275 ,639 3273 ,316	12 4 3 4 6	19,30 21,13 21,43 21,62 19,76	23,08 24,90 25,21 25,41 23,55	$4p ^4P^{\circ} - 4d ^4P$ $4p' ^2F^{\circ} - 5d ^4F$ $3d' ^2D - 6p ^2D^{\circ}$ $3d' ^2P - 6p ^2S^{\circ}$ $4p ^2D^{\circ} - 4d ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3270,474 3268,987 3263,572 3262,083 3259,656	5 5 12 2 6	21,62 19,22 19,30 21,62 21,62	25,41 23,01 23,10 25,42 25,42	$4d' {}^{2}P - ({}^{3}P_{2}) 5f [3]^{\circ}$ $4p {}^{4}P^{\circ} - 4d {}^{4}F$ $4p {}^{4}P^{\circ} - 4d {}^{4}F$ $3d' {}^{2}P - ({}^{3}P_{2}) 5f [2]^{\circ}$ $3d' {}^{2}P - ({}^{3}P_{2}) 5f [2]^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3258,894 3253,918 3249,801 3247,481 3243,689	2 3 15 3 14	17,69 19,26 19,30 21,62 19,26	21,50 23,07 23,12 25,44 23,08	$3d {}^{4}F - 4p' {}^{2}D^{\circ}$ $4p {}^{4}P^{\circ} - 4d {}^{4}F$ $4p {}^{4}P^{\circ} - 4d {}^{4}P$ $3d' {}^{2}P - ({}^{3}P_{2}) {}^{5}f [1]^{\circ}$ $4p {}^{4}P^{\circ} - 4d {}^{4}P$	7/2 - 5/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 1/2$
3241,708 3236,809 3235,175 3230,680 3230,021	2 6 3 2 4	22,95 19,80 21,43 21,13 21,13	26,77 23,63 25,26 24,96 24,96	$4d {}^{4}F$ — $({}^{3}P_{2}) 8f [5]^{\circ}$ $4p {}^{2}P^{\circ}$ — $4d {}^{2}P$ $3d' {}^{2}D$ — $6p {}^{2}P^{\circ}$ $4p' {}^{2}F^{\circ}$ — $5d {}^{4}P$ $4p' {}^{2}F^{\circ}$ — $5d {}^{4}F$	9/2— $11/2$ $1/2$ — $3/2$ $3/2$ — $3/2$ $5/2$ — $3/2$ $5/2$ — $5/2$
3225,973 3222,393 3221,625 3217,669 3216,729	6 6 7 5 8	19,26 21,50 19,22 21,49 21,14	23,10 25,34 23,07 25,34 24,99	$4p \ ^4P^{\circ} - 4d \ ^4F$ $4p' \ ^2D^{\circ} - 5d \ ^2D$ $4p \ ^4P^{\circ} - 4d \ ^4F$ $4p' \ ^2D^{\circ} - 5d \ ^2D$ $4p' \ ^2F^{\circ} - 5d \ ^2F$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 7/2 \end{array} $
3215,688 3212,516 3207,655 3207,577 3204,996	3 9 2 4 8	21,43 19,26 21,37 21,49 21,50	25,28 23,12 25,23 25,36 25,36	$3d' ^{2}D - 6p ^{4}S^{\circ}$ $4p ^{4}P^{\circ} - 4d ^{4}P$ $3d' ^{2}D - 6p ^{2}D^{\circ}$ $4p' ^{2}D^{\circ} - 5d ^{2}P$ $4p' ^{2}D^{\circ} - 5d ^{2}D$	3/2 - 3/2 $3/2 - 3/2$ $5/2 - 5/2$ $3/2 - 1/2$ $5/2 - 5/2$
3204,318 3203,392 3198,920 3195,752 3195,574	9 3 2 5 2	19,76 21,13 21,14 21,67 21,43	23,63 24,99 25,02 25,55 25,31	4p 2D°—4d 2P 4p' 2F°—5d 2F 4p' 2F°—5d 4P 3d' 2P—(3P ₁) 5f [2]° 3d' 2D—5p' 2D°	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3194,598 3194,229 3193,512 3192,363 3188,369	4 9 1 3 1	20,27 19,22 21,43 20,27 20,27	24,15 23,10 25,31 24,15 24,16	3d' ² F—(³ P ₂) 4f [4] ° 4p ⁴ P°—4d ⁴ F 3d' ² D—5p' ² D° 3d' ² F—(³ P ₂) 4f [4] ° 3d' ² F—(³ P ₂) 4f [3] °	7/2 - 9/2 $5/2 - 3/2$ $3/2 - 5/2$ $7/2 - 7/2$ $7/2 - 5/2$
3186, 169 3185, 734 3181, 038	5 3 12	20,27 21,13 19,22	24,16 25,02 23,12	$3d' ^2F$ — $(^3P_2) ^4f [3]^\circ$ $4p' ^2F^\circ$ — $5d ^4P$ $4p ^4P^\circ$ — $5d ^4P$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$

λ, Δ	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
3172,855 3171,403	3	19,97 20,24	23,87 24,45	$^{4}p\ ^{4}S^{\circ}-4d\ ^{2}D$ $^{3}d'\ ^{2}F-(^{3}P_{2})\ ^{4}f\ [4]^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3169,667 3167,464 3165,288 3163,535 3161,456	15 3 6 2 8	19,26 20,24 20,24 21,43 20,27	23,17 24,16 24,16 25,34 24,19	$4p^{4}P^{\circ}$ — $4d^{4}P$ $3d'^{2}F$ — $(^{3}P_{2})^{2}$ $4f^{\circ}[3]^{\circ}$ $3d'^{2}F$ — $(^{3}P_{2})^{2}$ $4f^{\circ}[3]^{\circ}$ $4p'^{2}P^{\circ}$ — $5d^{2}D$ $3d'^{2}F$ — $(^{3}P_{2})^{2}$ $4f^{\circ}[5]^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \end{array} $
3161,369 3154,289 3153,782 3152,613 3150,510	7 2 4 3 4	19,97 21,62 21,43 21,62 20,24	23,89 25,55 25,36 25,55 24,18	$\begin{array}{c} 4p \ ^2S^\circ - 4d \ ^2D \\ 3d' \ ^2P - (^3P_4) \ 5f \ [2]^\circ \\ 4p' \ ^2P^\circ - 5d \ ^2P \\ 3d' \ ^2P - (^3P_4) \ 5f \ [2]^\circ \\ 3d' \ ^2F - (^3P_2) \ 4f \ [2]^\circ \end{array}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 5/_{2} \end{array} $
3148,202 3146,422 3145,900 3143,891 3140,963	5 4 2 3 2	21,13 19,22 21,37 21,37 21,50	25,06 23,16 25,31 25,31 25,44	$4p' ^2F^{\circ} - 5d ^2F$ $4p ^4P^{\circ} - 4d ^2F$ $3d' ^2D - 5p' ^2D^{\circ}$ $3d' ^2D - 5p' ^2D^{\circ}$ $4p' ^2D^{\circ} - 5d ^2P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
3139,257 3139,015 3137,629 3136,481 3124,268	4 12 3 3 1	21,62 19,22 19,68 21,49 20,24	25,57 23,17 23,63 25,44 24,21	$3d' {}^{2}P - ({}^{3}P_{1}) 5f [3]^{\circ}$ $4p {}^{4}P^{\circ} - 4d {}^{4}P$ $4p {}^{2}D^{\circ} - 4d {}^{2}P$ $4p' {}^{2}D^{\circ} - 5d {}^{2}P$ $3d' {}^{2}F - ({}^{3}P_{2}) 4f [1]^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3114,378 3109,711 3108,801 3104,359 3102,953	3 4 2 5 1	21,43 21,43 17,14 21,35 22,77	25,41 25,41 21,13 25,34 26,77	$3d'^{2}D-6p^{2}S^{\circ}$ $3d'^{2}D-(^{3}P_{2})^{5}f[3]^{\circ}$ $4s^{2}P-4p'^{2}F^{\circ}$ $4p'^{2}P^{\circ}-5d^{2}D$ $4d^{4}D-(^{3}P_{2})^{8}f[4]^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 9/2 \end{array} $
3102,585 3101,004 3099,923 3094,960 3093,403	4 2 5 4 10	21,62 19,26 21,43 21,35 19,87	25,62 23,26 25,42 25,36 23,87	$3d'^{2}P$ — $(^{3}P_{0})$ 5 f [3]° $4p^{4}P^{\circ}$ — $4d^{2}F$ $3d'^{2}D$ — $(^{3}P_{2})$ 5 f [2]° $4p'^{2}P^{\circ}$ — $5d^{2}P$ $4p^{2}P^{\circ}$ — $4d^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
3088,910 3088,209 3085,026 3083,193 3082,979	3 7 5 1 5	21,43 21,35 21,43 19,61 21,43	25,44 25,36 25,44 23,63 25,45	$3d' {}^{2}D - ({}^{3}P_{2}) \ 5f \ [1]^{\circ} \ 4p' {}^{2}P^{\circ} - 5d {}^{2}D \ 4p' {}^{2}P^{\circ} - 5d {}^{2}P \ 4p {}^{4}P^{\circ} - 4d {}^{2}P \ 4p' {}^{2}P^{\circ} - 4d' {}^{2}S$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $
3066 ,889 3065 ,120 3062 ,643 3060 ,909 3053 ,151	6 3 3 8 5	20,27 21,37 21,37 21,37 21,37	24,31 25,41 25,41 25,41 25,42	$3d'$ ${}^{2}F$ — $({}^{3}P_{1})$ $4f$ $[4]$ c $3d'$ ${}^{2}D$ — $({}^{3}P_{2})$ $5f$ $[4]$ c $3d'$ ${}^{2}D$ — $({}^{3}P_{2})$ $5f$ $[3]$ o $3d'$ ${}^{2}D$ — $({}^{3}P_{2})$ $5f$ $[3]$ o $3d'$ ${}^{2}D$ — $({}^{3}P_{2})$ $5f$ $[2]$ o	7/2 - 9/2 $5/2 - 7/2$ $5/2 - 5/2$ $5/2 - 5/2$ $5/2 - 5/2$
3050,043 3048,784 3048,021 3046,079 3042,463	1 2 2 5 1	20,24 20,24 20,27 20,24 21,37	24,31 24,31 24,34 24,31 25,44	$3d' {}^{2}F$ — $({}^{3}P_{1}) 4f [2]^{\circ}$ $3d' {}^{2}F$ — $({}^{3}P_{1}) 4f [2]^{\circ}$ $3d' {}^{2}F$ — $({}^{3}P_{1}) 4f [3]^{\circ}$ $3d' {}^{2}F$ — $({}^{3}P_{1}) 4f [4]^{\circ}$ $3d' {}^{2}D$ — $({}^{3}P_{2}) 5f [1]^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3036,887 3033,510 3028,914 3028,721 3026,745	$\begin{array}{c} 2 \\ 10 \\ 8 \\ 3 \\ 5 \end{array}$	19,55 17,26 19,80 20,24 21,35 21,35	23,63 21,35 23,89 24,34 25,44 25,45	$4p ^4D^{\circ} - 4d ^2P$ $4s ^2P - 4p' ^2P^{\circ}$ $4p ^2P^{\circ} - 4d ^2D$ $3d' ^2F - (^3P_4) ^4f [3]^{\circ}$ $4p' ^2P^{\circ} - 5d ^2P$ $4p' ^2P^{\circ} - 4d' ^2S$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3014,481 3004,486 3002,961 3000,442 3000,110	6 2 6 9 5	19,76 21,43 21,43 19,76 20,24	23,87 25,55 25,55 23,89 24,38	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 72 - 72 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \end{array}$

λ, Å	I	$E_{\rm H}$, eV	E _B . eV	Transition	J
2999,110 2990,843 2979,051 2960,260 2957,532	2 2 15 5 3	20,24 21,43 17,26 21,67 21,67 21,43	24,38 25,57 21,43 25,86 25,86 25,62	$3d' {}^{2}F$ — $({}^{3}P_{0}) {}^{4}f [3]^{\circ}$ $3d' {}^{2}D$ — $({}^{3}P_{1}) {}^{5}f [3]^{\circ}$ $4s {}^{2}P$ — $4p' {}^{2}P^{\circ}$ $3d' {}^{2}P$ — $({}^{1}D) {}^{4}f [1]^{\circ}$ $3d' {}^{2}P$ — $({}^{1}D) {}^{4}f [1]^{\circ}$ $3d' {}^{2}D$ — $({}^{3}P_{0}) {}^{5}f [3]^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2956,541 2955,388 2947,275 2942,892 2941,893	4 10 2 20 1	21,37 19,68 21,37 17,14 19,68	25,56 23,87 25,57 21,35 23,89	$3d' ^{2}D$ — $(^{3}P_{4}) 5f [4]^{\circ}$ $4p ^{2}D^{\circ}$ — $4d ^{2}D$ $3d' ^{2}D$ — $(^{3}P_{4}) 5f [3]^{\circ}$ $4s ^{2}P$ — $4p' ^{2}P^{\circ}$ $4p ^{2}D^{\circ}$ — $4d ^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2935,538 2932,589 2931,483 2924,642 2915,967	3 8 9 10 1	21,14 17,26 21,67 21,62 19,64	25,36 21,49 25,90 25,86 23,89	4p' 2F°—5d 2D 4s 2P—4p' 2D° 3d' 2P—(\dangle D) 4f [2]° 3d' 2P—(\dangle D) 4f [1]° 4p 4D°—4d 2D	$ \frac{7}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{3}{2} $
2915,593 2914,932 2897,332 2896,753 2896,564	4 1 6 10 2	21,37 21,37 21,62 21,62 21,62	25,62 25,62 25,90 25,90 25,90	$\begin{array}{c} 3d' \ ^{2}D - (^{3}P_{0}) \ 5f \ [3]^{\circ} \\ 3d' \ ^{2}D - (^{3}P_{0}) \ 5f \ [3]^{\circ} \\ 3d' \ ^{2}P - (^{3}P_{2}) \ 7p \ [2]^{\circ} \\ 3d' \ ^{2}P - (^{1}D) \ 4f \ [2]^{\circ} \\ 3d' \ ^{2}P - (^{1}D) \ 4f \ [2]^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2893,985 2891,612 2879,327 2874,583 2871,399	1 18 4 3 1	19,61 17,14 19,97 19,97	23,89 21,43 — 24,28 24,28	$4p ^4D^{\circ}$ $-4d ^2D$ $4s ^2P$ $-4p' ^2P^{\circ}$ $-4p ^2S^{\circ}$ $-5s' ^2D$ $4p ^4S^{\circ}$ $-5s' ^2D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ - \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2871,022 2869,283 2865,841 2860,742 2847,816	1 1 4 3 3	21,13 21,62 19,55 20,74 17,14	25,44 25,94 23,87 25,07 21,49	4p' 2F°—5d 2P 3d' 2P—(1D) 4f [3]° 4p 4D°—4d 2D 4s" 2S—6p 4P° 4s 2P—4p' 2D°	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
2847,146 2844,129 2843,369 2806,168 2805,990	2 4 3 5 1	20,74 17,14 20,74 19,87 19,87	25,10 21,50 25,10 24,28 24,28	$4s'' ^2S - 6p ^4P^{\circ}$ $4s ^2P - 4p' ^2D^{\circ}$ $4s'' ^2S - 6p ^4D^{\circ}$ $4p ^2P^{\circ} - 5s' ^2D$ $4p ^2P^{\circ} - 5s' ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2800,919 2795,425 2795,289 2774,099 2772,740	1 2 2 2 2	21,67 { 21,43 21,43 21,67 20,74 21,62	26,10 25,86 25,86 26,11 25,21 26,09	$3d'$ ${}^{2}P$ — $({}^{3}P_{2})$ $6f$ $[2]$ ° $3d'$ ${}^{2}D$ — $({}^{1}D)$ $4f$ $[1]$ ° $3d'$ ${}^{2}D$ — $({}^{1}D)$ $4f$ $[1]$ °? $3d'$ ${}^{2}P$ — $({}^{3}P_{2})$ $6f$ $[1]$ ° $4s''$ ${}^{2}S$ — $6p$ ${}^{2}D$ ° $3d'$ ${}^{2}P$ — $({}^{3}P_{2})$ $6f$ $[3]$ °	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
2769 ,748 2767 ,945 2764 ,648 2763 ,520 2757 ,304	4 2 4 1 3	21,43 21,62 19,80 21,62 21,37	25,90 26,10 24,28 26,11 25,86	3d' ² P—(¹ D) 4f [2]° 3d' ² P—(³ P ₂) 6f [2]° 4p ² P°—5s' ² D 3d' ² P—(³ P ₂) 6f [1]° 3d' ² D—(¹ D) 4f [1]°	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 2/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2754,864 2744,797 2741,962 2741,067 2740,912	2 6 1 2 1	16,64 21,43 21,35 19,76 19,76	21 ,14 25 ,94 25 ,87 24 ,28 24 ,28	$4s ^4P - 4p' ^2F^\circ$ $3d' ^2D - (^1I) ^4f [3]^\circ$ $4p' ^2P^\circ - 6d ^4F$ $4p ^2D^\circ - 5s' ^2D$ $4p ^2D^\circ - 5s' ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2740,333 2733,022 2732,504 2732,335 2731,639	1 4 6 1 1 2	21,35 21,37 21,37 21,37 21,43 21,67	25,87 25,90 25,90 25,90 25,96 26,23	$4p' ^{2}P^{\circ} - 6d ^{4}P$ $3d' ^{2}D - (^{3}P_{2}) 7p [2]^{\circ}$ $3d' ^{2}D - (^{1}D) 4f [2]^{\circ}$ $3d' ^{2}D - (^{1}D) 4f [2]^{\circ}$ $4p' ^{2}P^{\circ} - 6d ^{2}D$ $3d' ^{2}P - (^{3}P_{3}) 6f [2]^{\circ}$	3/2 - 3/2 $5/2 - 5/2$ $5/2 - 5/2$ $5/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$
2720 ,184 2716 ,860	2	_			— [—] 365

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
2708 ,272 2708 ,052 2701 ,719	6 2 2	21 ,37 21 ,37 —	25 ,94 25 ,94 —	3d' ² D—(¹ D) 4f [3]° 3d' ² D—(¹ D) 4f [3]° —	5/2—7/2 5/2—5/2 —
2692,596 2690,033 2689,093 2687,395 2686,322	5 2 2 1 2	16,75 21,35 21,62 21,35 16,81	21,35 25,96 26,23 25,96 21,43	$4s ^4P - 4p' ^2P^{\circ} $ $4p' ^2P^{\circ} - 6d ^2F $ $3d' ^2P - (^3P_1) 6f [2]^{\circ} $ $4p' ^2P^{\circ} - 6d ^2D $ $4s ^4P - 4p' ^2P^{\circ} $	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
2683,094 2674,170 2656,303 2654,056 2652,899	3 2 2 2 1	21,62 21,35 21,43 21,62 21,43	26,24 25,98 26,09 26,29 26,10	$\begin{array}{c} 3d'\ ^{2}P-(^{3}P_{1})\ 6f\ [3]^{5} \\ 4p'\ ^{2}P^{\circ}-6d\ ^{2}P \\ 3d'\ ^{2}D-(^{3}P_{2})\ 6f\ [3]^{\circ} \\ 3d'\ ^{2}P-(^{3}P_{0})\ 6f\ [3]^{\circ} \\ 3d'\ ^{2}D-(^{3}P_{2})\ 6f\ [2]^{\circ} \end{array}$	3/2 - 5/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$
2651,906 2649,599 2647,844 2647,247 2636,906	2 2 1 6 2	21,43 16,75 21,43 19,97 21,35	26,10 21,43 26,11 24,65 26,05	$3d' {}^{2}D - ({}^{3}P_{2}) 6f [2]^{\circ}$ $4s {}^{4}P - 4p' {}^{2}P^{\circ}$ $3d' {}^{2}D - ({}^{3}P_{2}) 6f [1]^{\circ}$ $4p {}^{4}S^{\circ} - 6s {}^{4}P$ $4p' {}^{2}P^{\circ} - 6d {}^{2}D$	3/2 - 5/2 $3/2 - 1/2$ $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$
2636,354 2634,001 2627,397 2625,711 2624,593	2 2 3 1 3	$ \begin{array}{c} 16,42 \\ 18,73 \\ 19,97 \\ 16,42 \\ 16,41 \\ 19,97 \end{array} $	21,13 23,44 24,69 21,14 21,13 24,69	$3d\ ^4D - 4p'\ ^2F^\circ \ 3d\ ^2D - 5p\ ^4P^\circ \ 4p\ ^2S^\circ - 6s\ ^4P \ 3d\ ^4D - 4p'\ ^2F^\circ \ 3d\ ^4D - 4p'\ ^2F^\circ \ 4p\ ^4S^\circ - 6s\ ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2623,090 2621,879 2620,985 2617,596 2616,811	1 1 4 2 3	21,37 21,37 21,37 19,55 21,37 16,41	26,09 26,09 26,09 24,28 26,10 21,14	$3d'$ ^{2}D — $(^{3}P_{2})$ $6f$ $[4]$ $^{\circ}$ $3d'$ ^{2}D — $(^{3}P_{2})$ $6f$ $[3]$ $^{\circ}$ $3d'$ ^{2}D — $(^{3}P_{2})$ $6f$ $[3]$ $^{\circ}$ $4p$ ^{4}D $^{\circ}$ — $5s'$ ^{2}D $3d'$ ^{2}D — $(^{3}P_{2})$ $6f$ $[2]$ $^{\circ}$ $3d$ ^{4}D — $4p'$ ^{2}F $^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
2600,956 2592,178 2592,074 2591,696 2580,360	3 1 1 1	19,97 18,66 18,73 19,87 21,43	24,74 23,44 23,51 24,65 26,23	$4p^{2}S^{\circ}-4d'^{2}P$ $3d^{2}D-5p^{4}P^{\circ}$ $3d^{2}D-5p^{4}D^{\circ}$ $4p^{2}P^{\circ}-6s^{4}P$ $3d'^{2}D-(^{3}P_{1})^{\circ}$ 6f [2]°	$ \begin{array}{c} 1/2 & 3/2 \\ 3/2 & 3/2 \\ 3/2 & 5/2 \\ 5/2 & 5/2 \\ 3/2 & 5/2 \\ 3/2 & 3/2 \end{array} $
2579 ,428 2570 ,411 2569 ,984 2569 ,202 2567 ,727	2 4 3 4 1	21,43 19,97 18,62 19,87 19,97 19,97	26,23 24,79 23,44 24,69 24,79 24,79	$3d' {}^{2}D$ — $({}^{3}P_{1}) {}^{6}f [2]^{\circ}$ $4p {}^{2}S^{\circ}$ — $4d' {}^{2}D$ $3d {}^{2}F$ — $5p {}^{4}P^{\circ}$ $4p {}^{2}P^{\circ}$ — $6s {}^{4}P$ $4p {}^{4}S^{\circ}$ — $5d {}^{4}D$ $4p {}^{4}S^{\circ}$ — $4d' {}^{2}D$	3/2 - 5/2 $1/2 - 3/2$ $5/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$
2567,095 2565,782 2564,416 2562,090 2561,954	1 3 4 6 1	19,97 18,66 19,97 18,73 19,97	24,80 23,48 24,80 23,57 24,81	$4p^{2}S^{\circ}-6s^{2}P$ $3d^{2}D-5p^{4}P^{\circ}$ $4p^{4}S^{\circ}-6s^{2}P$ $3d^{2}D-5p^{4}D^{\circ}$ $4p^{2}S^{\circ}-6s^{4}P$	1/2 - 3/2 $3/2 - 1/2$ $3/2 - 3/2$ $5/2 - 3/2$ $1/2 - 1/2$
2560 ,853 2559 ,281 2556 ,586 2553 ,400 2551 ,571	1 3 4 2 1	20,27 19,97 19,97 16,64 18,66	25,11 24,81 24,81 21,50 23,51	$3d' {}^{2}F-6p {}^{4}D^{\circ}$ $4p {}^{4}S^{\circ}-6s {}^{4}P$ $4p {}^{4}S^{\circ}-5d {}^{4}D$ $4s {}^{4}P-4p' {}^{2}D^{\circ}$ $3d {}^{2}D-5p {}^{4}D^{\circ}$	7/2 - 5/2 $3/2 - 1/2$ $3/2 - 3/2$ $5/2 - 5/2$ $3/2 - 5/2$
2549,788 2547,184 2546,866 2545,642 2544,685 2540,037 2536,018	3 2 2 3 6 3	19,87 21,43 — 21,37 19,87 19,97 19,76	24,73 26,29 — 26,23 24,74 24,84 24,65	$\begin{array}{c} 4p\ ^{2}P^{\circ}-4d'\ ^{2}P \\ 3d'\ ^{2}D-(^{3}P_{0})\ 6f\ [3]^{\circ} \\ -\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2000,010 9cc	•	18.73	23,62	$3d ^2D - 5p ^2P^\circ$	5/2-3/2

λ, Λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2535,758 2535,250 2534,712	1 3 7	18,73 19,80 19,87	23,62 24,69 24,76	$3d\ ^{2}D-5p\ ^{2}D^{\circ}\ 4p\ ^{2}P^{\circ}-6s\ ^{4}P\ 4p\ ^{2}P^{\circ}-4d'\ ^{2}D$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2530,423 2528,679 2528,318 2526,076 2525,479	1 3 4 2 4	18,62 19,97 21,50 19,97 21,49	23,51 24,87 26,40 24,87 26,40	$3d^{2}F - 5p^{4}D^{\circ}$ $4p^{2}S^{\circ} - 6s^{2}P$ $4p'^{2}D^{\circ} - 6s'^{2}D$ $4p^{4}S^{\circ} - 6s^{2}P$ $4p'^{2}D^{\circ} - 6s'^{2}D$	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/1 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
2522,497 2516,791 2515,598 2515,272 2512,260	4 6 4 3 4	18,66 18,66 19,80 19,76 19,87	23,57 23,58 24,73 24,69 24,80	$3d^{2}D-5p^{4}D^{\circ} \ 3d^{2}D-5p^{2}P^{\circ} \ 4p^{2}P^{\circ}-4d^{\prime}^{2}P \ 4p^{2}D^{\circ}-6s^{4}P \ 4p^{2}P^{\circ}-6s^{2}P$	3/2 $-3/2$ $3/2$ $-1/2$ $1/2$ $1/2$ $1/2$ $3/2$ $-3/2$ $3/2$ $-3/2$
2510,624 2508,548 2507,333 2504,738 2503,935	3 1 3 3 4	19,80 20,24 19,87 19,87 18,73	24,74 25,19 24,81 24,81 23,68	$4p^{2}P^{\circ}-4d^{\prime}^{2}P$ $3d^{\prime}^{2}F-5p^{\prime}^{2}F^{\circ}$ $4p^{2}P^{\circ}-6s^{4}P$ $4p^{2}P^{\circ}-5d^{4}D$ $3d^{2}D-5p^{2}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2501,836 2500,397 2499,527 2497,221 2495,920	4 5 4 3 2	18,62 19,97 19,87 18,66 19,76	23,57 24,92 24,82 23,62 24,73	$3d^{2}F$ - $5p^{4}D^{\circ}$ $4p^{4}S^{\circ}$ - $5d^{4}P$ $4p^{2}P^{\circ}$ - $4d^{\prime}^{2}F$ $3d^{2}D$ - $5p^{2}P^{\circ}$ $4p^{2}D^{\circ}$ - $4d^{\prime}^{2}P$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
2494,114 2492,013 2491,036 2486,906 2483,225	4 3 4 3 2	{ 18,73 19,68 21,43 19,76 18,45 18,66	23,70 24,65 26,40 24,74 23,44 23,65	$3d^{2}D-5p^{4}S^{\circ}$ $4p^{2}D^{\circ}-6s^{4}P$ $4p'^{2}P^{\circ}-6s'^{2}D$ $4p^{2}D^{\circ}-4d'^{2}P$ $4s'^{2}D-5p^{4}P^{\circ}$ $3d^{2}D-5p^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
2482,151 2481,478 2480,858 2480,467 2479,055	4 5 6 3 5	19,80 19,76 19,97 19,97 19,80	24,79 24,76 24,96 24,96 24,80	$4p \ ^{2}P^{\circ}-4d' \ ^{2}D$ $4p \ ^{2}D^{\circ}-4d' \ ^{2}D$ $4p \ ^{4}S^{\circ}-5d \ ^{4}P$ $4p \ ^{4}S^{\circ}-5d \ ^{4}F$ $4p \ ^{2}P^{\circ}-6s \ ^{2}P$	$\begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \end{array}$
2476,970 2475,462 2474,252 2473,998 2470,355	$egin{array}{c} 2 \\ 4 \\ 1 \\ 4 \\ 3 \end{array}$	18,62 19,87 19,80 19,68 18,66	23,62 24,87 24,81 24,69 23,67	$3d^{2}F - 5p^{2}P^{\circ}$ $4p^{2}P^{\circ} - 6s^{2}P$ $4p^{2}P^{\circ} - 6s^{4}P$ $4p^{2}D^{\circ} - 6s^{4}P$ $3d^{2}D - 5p^{2}S^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array}$
2469,876 2462,998 2461,203 2460,635 2459,953	2 2 1 2 4	18,49 19,76 19,11 20,27 19,76	23,51 24,79 24,15 25,31 24,80	3d ² F-5p ⁴ D° 4p ² D°-4d′ ² D 3d′ ² G-(³ P ₂) 4f [4]° 3d′ ² F-5p′ ² D° 4p ² D°-6s ² P	7/2 - 5/2 $3/2 - 3/2$ $7/2 - 7/2$ $7/2 - 5/2$ $3/2 - 3/2$
2457,954 2457,525 2456,266 2455,628 2455,235	2 1 2 1 1	19,97 19,11 19,80 19,64 19,76	25,01 24,16 24,84 24,69 24,81	$4p {}^{4}S^{\circ} - 5d {}^{4}F$ $3a' {}^{2}G - ({}^{3}P_{2}) 4f [3]^{\circ}$ $4p {}^{2}P^{\circ} - 5d {}^{4}D$ $4p {}^{4}D^{\circ} - 6s {}^{4}P$ $4p {}^{2}D^{\circ} - 6s {}^{4}P$	3/2 - 3/2 $7/2 - 7/2$ $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 1/2$
2455,080 2454,270 2452,743 2450,541 2449,407	5 8 2 1 2	21,35 19,97 19,76 19,68 20,24	26,40 25,02 24,81 24,74 25,31	$4p'\ ^{2}P^{\circ}-6s'\ ^{2}D$ $4p\ ^{4}S^{\circ}-5d\ ^{4}P$ $4p\ ^{2}D^{\circ}-5d\ ^{4}D$ $4p\ ^{2}D^{\circ}-4d'\ ^{2}P$ $3d'\ ^{2}F-5p'\ ^{2}D^{\circ}?$	3/2 - 5/2 $3/2 - 5/2$ $3/2 - 3/2$ $5/2 - 3/2$ $5/2 - 3/2$
2449 ,179 2447 ,743 2446 ,355 2444 ,828 2443 ,219	2 2 1 3 2	18,43 19,76 18,62 18,33 19,80	23,48 24,82 23,68 23,40 24,87	$4s' ^{2}D - 5p ^{4}P^{\circ}$ $4p ^{2}D^{\circ} - 4a' ^{2}F$ $3d ^{2}F - 5p ^{2}D^{\circ}$ $3d ^{4}P - 5p ^{4}P^{\circ}$ $4p ^{2}P^{\circ} - 6s ^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \end{array} $

λ, Λ	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
2442,794 2441,288 2440,028 2437,517 2437,200	2 2 4 2 1	19,11 19,68 19,61 19,76 19,64	24,19 24,76 24,69 24,84 24,73	$3d' ^2G$ — $(^3P_2) 4f [5]^\circ$ $4p ^2D^\circ$ — $4d' ^2D$ $4p ^4D^\circ$ — $6s ^4P$ $4p ^2D^\circ$ — $5d ^4D$ $4p ^4D^\circ$ — $4d' ^2P$	7/2 - 9/2 $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$
2434,364 2431,923 2431,62 2430,032 2429,446	2 1 2 5 2	16,41 19,97 19,87 19,55 19,68	21,50 25,06 24,96 24,65 24,78	$3d ^4D - 4p' ^2D^{\circ}$ $4p ^4S^{\circ} - 5d ^2F$ $4p ^2P^{\circ} - 5d ^4F^{\circ}$ $4p ^4D^{\circ} - 6s ^4P$ $4p ^2D^{\circ} - 5d ^4D$	$ \begin{array}{c} 7/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
2428,523 2424,659 2423,528 2422,695 2422,089	1 4 5 4 2	$18,33 \\ 19,76 \\ 19,68 \\ 18,29 \\ 18,45 \\ 21,50$	23,44 24,87 24,79 23,40 23,57 26,61	$3d\ ^4P - 5p\ ^4P^\circ \ 4p\ ^2D^\circ - 6s\ ^2P \ 4p\ ^2D^\circ - 4d'\ ^2D? \ 3d\ ^4P - 5p\ ^4P^\circ \ ^4s'\ ^2D - 5p\ ^4D^\circ \ 4p'\ ^2D^\circ - 5d'\ ^2D$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2421,502 2420,457 2419,413 2419,164 2418,704	3 6 1 1 1	20,74 19,68 21,49 19,80 18,49	25,86 24,80 26,61 24,92 23,62	$4s'' ^2S - (^1D) 4f [1]^\circ$ $4p ^2D^\circ - 6s ^2P$ $4p' ^2D^\circ - 5d' ^2D$ $4p ^2P^\circ - 5d ^4P$ $3d ^2F - 5p ^2D^\circ$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \end{array} $
2417,214 2414,224 2413,486 2412,910 2412,461	2 5 1 1 4	19,61 19,68 19,68 20,27 21,50	24,74 24,81 24,81 25,41 26,63	$4p ^4D^{\circ} - 4d' ^2P$ $4p ^2D^{\circ} - 4d' ^2F$ $4p ^2D^{\circ} - 5d ^4D$ $3d' ^2F - (^3P_2) 5f [4]^{\circ}$ $4p' ^2D^{\circ} - 5d' ^2F$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array}$
2410,94 2409,702 2409,503 2408,943 2408,207	6 1 2 1 2	19,55 18,43 20,27 18,66 19,61	24,69 23,57 25,41 23,80 24,76	$4p ^4D^{\circ} - 6s ^4P$ $4s' ^2D - 5p ^4D^{\circ}$ $3d' ^2F - (^3P_2) 5f [3]^{\circ}$ $3d ^2D - 4p'' ^2P^{\circ}$ $4p ^4D^{\circ} - 4d' ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2407,862 2406,647 2405,776 2405,228 2404,352	2 5 2 5 9	21,50 18,33 19,64 21,49 19,49	26,64 23,48 24,79 26,64 24,65	$4p' ^{2}D^{\circ} - 5d' ^{2}F$ $3d ^{4}P - 5p ^{4}D^{\circ}$ $4p ^{4}D^{\circ} - 4d' ^{2}D$ $4p' ^{2}D^{\circ} - 5d' ^{2}F$ $4p ^{4}D^{\circ} - 6s ^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \end{array} $
2403 ,237 2399 ,851 2399 ,372 2398 ,372 2397 ,548	5 3 2 5 2	20,27 	25,43 — 23,62 24,81 25,41	$3d' {}^{2}F$ — $({}^{3}P_{2}) 5f [5]^{\circ}$ — $4s' {}^{2}D$ — $5p {}^{2}P^{\circ}$ $4p {}^{4}D^{\circ}$ — $6s {}^{4}P$ $3d' {}^{2}F$ — $({}^{3}P_{2}) 5f [3]^{\circ}$	$\frac{\frac{7}{2}-\frac{9}{2}}{-\frac{5}{2}-\frac{3}{2}}$ $\frac{\frac{1}{2}-\frac{3}{2}}{\frac{1}{2}-\frac{1}{2}}$ $\frac{5}{2}-\frac{7}{2}$
2390,878 2388,268 2387,933 2385,936 2384,969	2 1 3 1 4	18,25 18,66 19,61 19,11 19,87	23,44 23,85 24,80 24,31 25,06	$3d\ ^4P - 5p\ ^4P^\circ \ 3d\ ^2D - 4p''\ ^2P^\circ \ 4p\ ^4D^\circ - 6s\ ^2P \ 3d'\ ^2G - (^3P_1)\ 4f\ [4]^\circ \ 4p\ ^2P^\circ - 5d\ ^2F$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 7/_{2} - 9/_{2} \\ 3/_{2} - 5/_{2} \end{array} $
2383,934 2383,486 2382,955 2381,138 2379,863	2 6 1 3 3	18,29 19,61 19,76 19,61 19,55	23,48 24,81 24,96 24,81 24,76	$3d {}^{4}P - 5p {}^{4}P^{\circ}$ $4p {}^{4}D^{\circ} - 6s {}^{4}P$ $4p {}^{2}D^{\circ} - 5d {}^{4}P$ $4p {}^{4}D^{\circ} - 5d {}^{4}D$ $4p {}^{4}D^{\circ} - 4d' {}^{2}D$	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array}$
2376,430 2371,718 2371,662 2369,916 2369,487	1 4 1 2 2	19,61 19,68 18,29 	24,82 24,90 23,51 — 24,87	$4p ^4D^{\circ} - 4d' ^2F$ $4p ^2D^{\circ} - 5d ^4F$ $3d ^4P - 5p ^4D^{\circ}$ $ 4p ^4D^{\circ} - 6s ^2P$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ - \\ 1/2 - 1/2 \end{array} $
2368,612 2367,248 368	1 1	19,55 18,33	24,78 23,57	4p 4D°—5d 4D 3d 4P—5p 4D°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{3}{2}$

λ. Α	I	E _H , eV	E _B , eV	Transition	J
2366 ,778 2364 ,112 2362 ,866	2 5 1	19,61 19,55 19,55	24,84 24,79 24,79	$4p ^4D^{\circ} - 5d ^4D$ $4p ^4D^{\circ} - 5d ^4D$ $4p ^4D^{\circ} - 4d' ^2D$	$^{3/2}_{5/2}$ $^{5/2}_{5/2}$ $^{5/2}_{5/2}$
2362,083 2360,058 2358,408 2357,589 2354,793	1 4 2 5 1	18,43 19,55 19,76 21,14 21,35	23,67 24,80 25,02 26,40 26,61	$4s' ^2D - 5p ^2S^{\circ}$ $4p ^4D^{\circ} - 6s ^2P$ $4p ^2D^{\circ} - 5d ^4P$ $4p' ^2F^{\circ} - 6s' ^2D$ $4p' ^2P^{\circ} - 5d' ^2D$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
2354 ,135 2353 ,426 2352 ,731 2350 ,486	6 3 2 5	19,55 19,55 — 21,13	24,81 24,81 — 26,40	$4p ^4D^{\circ} - 4d' ^2F$ $4p ^4D^{\circ} - 5d ^4D$ $ 4p' ^2F^{\circ} - 6s'^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2348 ,910 2346 ,570 2344 ,204 2339 ,795 2337 ,780	1 2 6 4 6	21,37 { 19,64 18,29 19,49 19,49 19,76	26,64 24,92 23,57 24,78 24,79 25,06	$3d' {}^{2}D - ({}^{3}P_{1}) 7f [4]^{\circ}$ $4p {}^{4}D^{\circ} - 5d {}^{4}P$ $3d {}^{4}P - 5p {}^{4}D^{\circ}$ $4p {}^{4}D^{\circ} - 5d {}^{4}D$ $4p {}^{4}D^{\circ} - 5d {}^{4}D$ $4p {}^{2}D^{\circ} - 5d {}^{2}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
2333,036 2332,895 2331,452 2329,357 2327,784 2324,427	2 1 8 1 2 3	20,24 21,35 18,25 19,68 19,64 20,24 18,29	25,56 26,66 23,57 24,99 24,96 25,57 23,62	$3d' {}^{2}F - ({}^{3}P_{1}) 5f [4]^{\circ}$ $4p' {}^{2}P^{\circ} - 5s'' {}^{2}S$ $3d {}^{4}P - 5p {}^{4}D^{\circ}$ $4p {}^{2}D^{\circ} - 5d {}^{2}F$ $4p {}^{4}D^{\circ} - 5d {}^{4}P$ $3d' {}^{2}F - ({}^{3}P_{1}) 5f [3]^{\circ}$ $3d {}^{4}P - 5p {}^{2}D^{\circ}$	5/2— $7/2$ $3/2$ — $1/2$ $1/2$ — $3/2$ $5/2$ — $7/2$ $1/2$ — $3/2$ $5/2$ — $7/2$ $3/2$ — $5/2$
2322,081 2317,745 2316,299 2315,306 2314,970	2 5 8 3 6	19,68 18,45 19,49 19,61 19,61	25,02 23,80 24,84 24,96 24,96	$4p^{2}D^{\circ}-5d^{4}P$ $4s'^{2}D-4p''^{2}P^{\circ}$ $4p^{4}D^{\circ}-5d^{4}F$ $4p^{4}D^{\circ}-5d^{4}P$ $4p^{4}D^{\circ}-5d^{4}F$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
2313,720 2309,860 2309,148 2307,456 2307,266	7 2 6 2 2	19,55 18,25 19,64 20,04 19,97	24,90 23,62 25,01 25,62 25,34	$4p ^4D^{\circ} - 5d ^4F$ $3d ^4P - 5p ^2P^{\circ}$ $4p ^4D^{\circ} - 5d ^4F$ $3d' ^2F - (^3P_0) 5f [3]^{\circ}$ $4p ^2S^{\circ} - 5d ^2D$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \end{array} $
2305,859 2302,077 2301,825 2300,179 2297,879	2 4 3 5 2	18,43 { 19,68 19,97 19,30 19,26 18,25	23,80 25,06 25,36 24,69 24,65 23,65	$4s' ^{2}D - 4p'' ^{2}P^{\circ}$ $4p ^{2}D^{\circ} - 5d ^{2}F$ $4p ^{2}S^{\circ} - 5d ^{2}P$ $4p ^{4}P^{\circ} - 6s ^{4}P$ $4p ^{4}P^{\circ} - 6s ^{4}P$ $3d ^{4}P - 5p ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
2295,349 2292,130 2290,425 2289,771 2289,376	3 4 3 5 2	19,61 19,61 19,49 21,14 18,29	25,01 25,02 24,90 26,55 23,70	$4p\ ^4D^{\circ}$ — $5d\ ^4F$ $4p\ ^4D^{\circ}$ — $5d\ ^4P$ $4p\ ^4D^{\circ}$ — $5d\ ^4F$ $4p'\ ^2F^{\circ}$ — $5d'\ ^2G$ $3d\ ^4P$ — $5p\ ^4S^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \end{array} $
2288,765 2286,925 2285,801 2285,612 2283,994	4 4 4 1 7	19,55 18,43 18,73 19,30 19,22	24,96 23,85 24,15 24,73 24,65	4p 4D°-5d 4F 4s' 2D-4p" 2P° 3d 2D-(3P ₂) 4f [4]° 4p 4P°-4d' 2P 4p 4P°-6s 4P	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2283,753 2283,243 2282,621 2281,512 2275,358 2275,054	1 7 8 1 3	18,73 21,13 18,25 18,73 19,30 19,55 18,25	24,16 26,55 23,68 24,16 24,74 24,99 23,70	$3d^{2}D - (^{3}P_{2}) 4f [3]^{\circ}$ $4p'^{2}F^{\circ} - 5d'^{2}G$ $3d^{4}P - 5p^{2}D^{\circ}$ $3d^{2}D - (^{3}P_{2}) 4f [3]^{\circ}$ $4p^{4}P^{\circ} - 4d'^{2}P$ $4p^{4}D^{\circ} - 5d^{2}F$ $3d^{4}P - 5p^{4}S^{\circ}$ $3d^{2}D - (^{3}P_{2}) 4f [2]^{\circ}$	$ \begin{array}{c} $
2274,923	3	18,73	24,18	$3d ^{2}D - (^{3}P_{2}) 4f [2]^{\circ}$	72 72

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2272,640 2267,111 2266,441	2 2 2	19,61 { 19,22 19,26 19,55	25,06 24,69 24,73 25,02	$4p ^4D^{\circ} - 5d ^2F$ $4p ^4P^{\circ} - 6s ^4P$ $4p ^4P^{\circ} - 4d' ^2P$ $4p ^4D^{\circ} - 5d ^4P$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
2265,215 2263,068 2262,632 2258,342 2257,965	4 2 2 1 1	19,97 19,26 21,67 21,13 19,30	25,44 24,74 27,15 26,61 24,79	$4p^{2}S^{\circ}-5d^{2}P$ $4p^{4}P^{\circ}-4d'^{2}P$ $3d'^{2}P-(^{1}D)^{5}f^{2}$ $4p'^{2}F^{\circ}-5d'^{2}D$ $4p^{4}P^{\circ}-4d'^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
2256,545	3	21,14	26,63	$4p' ^2F^{\circ} - 5d' ^2F$	7/2 - 7/2 $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$
2255,408	3	19,30	24,80	$4p ^4P^{\circ} - 6s ^2P$	
2255,178	1	19,26	24,76	$4p ^4P^{\circ} - 4d' ^2D$	
2254,283	5	19,87	25,36	$4p ^2P^{\circ} - 5d ^2D$	
2252,248	6	18,66	24,16	$3d ^2D - (^3P_2) 4f [3]^{\circ}$	
2251,403	2	19,30	24,81	$4p ^4P^{\circ} - 6s ^4P?$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2249,658	1	18,06	23,57	$3d ^2P - 5p ^4D^{\circ}$	
2249,347	3	19,30	24,81	$4p ^4P^{\circ} - 5d ^4D$	
2245,975	3	21,13	26,64	$4p' ^2F^{\circ} - 5d' ^2F$	
2245,410	2	18,66	24,18	$3d ^2D - (^3P_2) 4f [2]^{\circ}$	
2245 ,116	2	18,06	23,58	$3d^{2}P - 5p^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
2244 ,080	1	19,49	25,02	$4p^{4}D^{\circ} - 5d^{4}P$	
2243 ,662	5	18,66	24,18	$3d^{2}D - (^{3}P_{2}) 4f [2]^{\circ}$	
2241 ,858	2	21,62	27,15	$3d'^{2}P - (^{1}D) 5f [2]^{\circ}$	
2241 ,028	6	19,26	24,79	$4p^{4}P^{\circ} - 5d^{4}D$	
2239,906	1	19,26	24,79	$4p ^4P^{\circ} - 4d' ^2D$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
2237,721	2	18,62	24,15	$3d ^2F - (^3P_2) 4f [4]^{\circ}$	
2237,385	1	19,26	24,80	$4p ^4P^{\circ} - 6s ^2P$	
2236,527	3	19,30	24,84	$4p ^4P^{\circ} - 5d ^4D$	
2235,904	2	19,80	25,34	$4p ^2P^{\circ} - 5d ^2D$	
2235,760	3	18,62	24,16	$3d^{2}F$ — $(^{3}P_{2})$ $4f$ $[3]^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array}$
2234,673	6	18,62	24,16	$3d^{2}F$ — $(^{3}P_{2})$ $4f$ $[3]^{\circ}$	
2233,478	4	19,26	24,81	$4p^{4}P^{\circ}$ — $6s^{4}P$	
2231,423	5	19,26	24,81	$4p^{4}P^{\circ}$ — $5d^{4}D$	
2231,024	1	19,80	25,36	$4p^{2}P^{\circ}$ — $5d^{2}P$	
2230,317 2229,648 2227,298 2225,662 2224,550	3 8 5 6 1	18,66 19,22 { 18,62 19,26 19,22 19,22	24,21 24,78 24,18 24,82 24,79 24,79	$3d^{2}D$ — $(^{3}P_{2})$ $4f$ [1]° $4p^{4}P^{\circ}$ — $5d^{4}D$ $3d^{2}F$ — $(^{3}P_{2})$ $4f$ [2]° $4p^{4}P^{\circ}$ — $4d'^{2}F$? $4p^{4}P^{\circ}$ — $5d^{4}D$ $4p^{4}P^{\circ}$ — $4d'^{2}D$	$ \begin{array}{c} 3/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
2222,066 2221,352 2220,347 2219,962 2218,805	3 1 2 6 4	{ 18,73 19,22 19,87 19,76 18,73 19,26	24,31 24,80 25,45 25,34 24,31 24,84	$\begin{array}{c} 3d\ ^2D - (^3P_1)\ 4f\ [2]^\circ \\ 4p\ ^4P^\circ - 6s\ ^2P \\ 4p\ ^2P^\circ - 4d'\ ^2S \\ 4p\ ^2D^\circ - 5d\ ^2D \\ 3d\ ^2D - (^3P_1)\ 4f\ [4]^\circ \\ 4p\ ^4P^\circ - 5d\ ^4D \end{array}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
2218,375	1	18,06	23,65	3d ² P—5p ⁴ D°	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
2216,190	4	19,22	24,81	4p ⁴ P°—5d ⁴ D	
2214,147	1	18,62	24,21	3d ² F—(³ P ₂) 4f [1]°	
2210,883	3	18,73	24,34	3d ² D—(³ P ₁) 4f [3]°	
2210,321	2	18,73	24,34	3d ² D—(³ P ₁) 4f [3]°	
2205,738 2204,698 2202,135 2201,573 2201,242	4 1 1 1 2	19,30 18,06 17,94 20,27 20,27	24,92 23,68 23,57 25,90 25,90	$4p \ ^4P^{\circ} - 5d \ ^4P \ 3d \ ^2P - 5p \ ^2D^{\circ} \ 3d \ ^2P - 5p \ ^4D^{\circ} \ 3d' \ ^2F - (^3P_2) \ 7p \ [2]^{\circ} \ 3d' \ ^2F - (^1D) \ 4f \ [2]^{\circ}$	$^{1/2}_{2}$ $^{-1/2}_{2}$ $^{3/2}_{2}$ $^{-3/2}_{2}$ $^{1/2}_{2}$ $^{-3/2}_{2}$ $^{7/2}_{2}$ $^{-5/2}_{2}$
2197,786	1	17,94	23,58	3d ² P-5p ² P°	$^{1/_{2}$ _{1/ ₂ }}_{^{1/_{2}}
2196,389	1	19,80	25,44	4p ² P°-5d ² P	

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2195 ,445 2194 ,907 2192 ,224	5 2 2	18,73 18,73 18,66	24,38 24,38 24,31	3d ² D-(³ P ₀) 4f [3] ³ 3d ² D-(³ P ₀) 4f [3] ³ 3d ² D-(³ P ₁) 4f [2] ³	5 $^{-5}$ $^{-5}$
2191,579	4	{ 20,24 18,66	25 ,90 24 ,31	$3d' {}^{2}F$ —(${}^{3}P_{2}$) $7p$ [2] $3d {}^{2}D$ —(${}^{3}P_{1}$) $4f$ [2] ${}^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2191,287	5	$\left\{\begin{array}{c} 18,49 \\ 20,24 \end{array}\right.$	$\substack{24,15\\25,90}$	$3d^{2}F$ — $(^{3}P_{2})$ 4f [4]° $3d'^{2}F$ — (^{1}D) 4f [2]°	$\frac{7}{2}$ $\frac{9}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2190 ,511 2190 ,235 2188 ,492	4 2 3	19,30 18,49 19,26	$24,96 \ 24,15 \ 24,92$	$4p ^4P^{\circ} - 5d ^4P$ $3d ^2F - (^3P_2) 4f [4]^{\circ}$ $4p ^4P^{\circ} - 5d ^4P$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{-7}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
2187 ,320 2185 ,489	6 5	$18,49 \\ 20,27$	$24,16 \\ 25,94$	$3d^{2}F$ — $(^{3}P_{2})$ $4f$ [3]° $3d'^{2}F$ — (^{1}D) $4f$ [3]°	$^{7}/_{2}$ — $^{7}/_{2}$
2181 ,378 2181 ,211 2180 ,789	1 7 1	19,76 20,27 18,66	$25,44 \\ 25,95 \\ 24,34$	4p ² D°-5a ² P 3d' ² F-(¹ D) 4f [4]° 3d ² D-(³ P ₁) 4f [3]°	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{3}{2} - \frac{5}{2} $
2180,247 2180,089	$\frac{1}{2}$	18,49 19,68	$24,18 \\ 25,36$	$3d\ ^{2}F$ ($^{3}P_{2}$) 4f [2]° $4p\ ^{2}D$ °5 $d\ ^{2}D$	$^{5/2}_{2}$ — $^{5/2}$
2176,387 21 7 5,959	$\frac{1}{2}$	17,74 18,62	23,44 24,31	$3d {}^{4}F - 5p {}^{4}P^{\circ}$ $3d {}^{2}F - ({}^{3}P_{1}) {}^{4}f [2]^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ \hline 5/2 - 7/2 \end{array}$
2175,636	10	$\left\{\begin{array}{c} 20,24\\ 18,49\\ 20,24 \end{array}\right.$	25 ,94 24 ,19 25 ,94	3d' ² F—(¹ D) 4f [3]° 3d ² F—(³ P ₂) 4f [5]° 3d' ² F—(¹ D) 4f [3]°	$\frac{7}{2} - \frac{7}{2}$ $\frac{7}{2} - \frac{9}{2}$ $\frac{5}{2} - \frac{5}{2}$
2174,585 2174,190	5 2	18,62 18,45	24,31 24,15	$3d^{2}F$ — $(^{3}P_{1})$ $4f$ $[4]^{6}$ $4s'^{2}D$ — $(^{3}P_{2})$ $4f$ $[4]^{6}$	⁵ / ₂ — ⁷ / ₂
2173,209 2172,637 2172,341	$\begin{array}{c} 1 \\ 2 \\ 2 \end{array}$	19,26 19,30 18,45	24,96 25,01 24,16	$4p ^4P^{\circ} - 5d ^4F$ $4p ^4P^{\circ} - 5d ^4F$ $4s' ^2D - (^3P_2) 4f [3]^{\circ}$	$\frac{3}{2} - \frac{5}{2}$ $\frac{1}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{5}{2}$
2171 ,418 2171 ,312	5 3	20,24 18,45	25,95 24,16	$3d'$ ${}^{2}F$ — $({}^{1}D)$ $4f$ $[4]$ ° $4s'$ ${}^{2}D$ — $({}^{3}P_{2})$ $4f$ $[3]$ °	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2171 ,038 2170 ,914 2165 ,821	1 1 6	19,97 17,69 18,62	$25,67 \\ 23,40 \\ 24,34$	$\begin{array}{c} 4p \ ^{4}S^{\circ} - 7s \ ^{4}P \\ 3d \ ^{4}F - 5p \ ^{4}P^{\circ} \\ 3d \ ^{2}F - (^{3}P_{1}) \ 4f \ [3]^{\circ} \end{array}$	$\begin{array}{c} 3/2 - 5/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \end{array}$
2164,351 2162,292	$\frac{2}{2}$	18,45 17,94	$24,18 \\ 23,67$	$\frac{4s'}{3} \frac{^{2}D}{-} \frac{(^{3}P_{2})}{5p} \frac{4f}{^{2}S} \frac{[2]^{\circ}}{(^{2}S^{\circ})^{\circ}}$	$^{1}/_{2}$ — $^{1}/_{2}$
2161,895 2159,046	$\frac{3}{2}$	$ \begin{array}{c} 18,43 \\ 19,22 \\ 17,94 \end{array} $	24,16 24,96 23,68	$4s' ^{2}D$ — $(^{3}P_{2}) 4f [3]' \ 4p ^{4}P^{\circ}$ — $5d ^{4}P \ 3d ^{2}P$ — $5p ^{2}D^{\circ}$	$\frac{3}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$
2158,883	2	18,06	23,80	$3d^{2}P - 4p''^{2}P^{\circ}$ $4p^{4}P^{\circ} - 5d^{4}F$	$\frac{3/2}{2}$ $\frac{3/2}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2158 ,755 2155 ,588 2153 ,980	$\begin{array}{c} 2\\1\\3\end{array}$	19,22 18,43 18,43	24,96 24,18 24,18	$4s' {}^{2}D - ({}^{3}P_{2}) 4f [2]' \\ 4s' {}^{2}D - ({}^{3}P_{2}) 4f [2]'$	$^{3}/_{2}^{-}$ $^{3}/_{2}^{-}$
2153,068 2151,052	3 6	19,26 18,62	$25,02 \\ 24,38$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	5/27/2
2150,537 2147,681	2 2 2	18,62 17,74 19,22	24,38 23,51 24,99	$3d {}^{2}F$ — $({}^{3}P_{0}) 4f [3]$ $3d {}^{4}F$ — $5p {}^{4}D^{\circ}$ $4p {}^{4}P^{\circ}$ — $5d {}^{2}F$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array}$
2146 ,823 2143 ,884 2142 ,263	$\frac{2}{3}$	13,48 18,06	19,26 $23,85$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
2141,682	2	$\left\{\begin{array}{c} 18,43 \\ 19,22 \end{array}\right.$	24,21 25,01	$4s' {}^{2}D - ({}^{3}P_{2}) 4f [1]'$ $4p {}^{4}P^{\circ} - 5d {}^{4}F$	$^{5}/_{2}$ — $^{3}/_{2}$
2140,747 2138,882	$\begin{array}{c}2\\3\\6\end{array}$	17,69 19,22 18,49	$23,48 \ 25,02 \ 24,31$	3d ⁴ F-5p ⁴ D° 4p ⁴ P°-5d ⁴ P 3d ² F-(³ P ₁) 4f [4]	$ \begin{array}{c} 7/_{2} - 7/_{2} \\ 5/_{2} - 5/_{2} \\ 7/_{2} - 9/_{2} \end{array} $
2130 ,429 2129 ,810	3	17,69	23,51	$3d$ 4F $-5p$ 4D $^{\circ}$	$\frac{7}{2}$ _5/2
2129,427 2127,646 2127,050	4 3 2	18,33 18,33 17,74	$24,15 \\ 24,16 \\ 23,57$	$3d^{4}P$ — $(^{3}P_{2})$ 4f [4] $3d^{4}P$ — $(^{3}P_{2})$ 4f [3] $3d^{4}F$ — $5p^{4}D^{\circ}$	5/2-5/2 5/2-3/2
2127,030 2126,668 2125,706	4 1	18,33 20,27	24,16 26,10	$3d^{4}P - (^{3}P_{2}) 4f$ [3] $3d'^{2}F - (^{3}P_{2}) 6f$ [5]	° 5/2—7/2

λ, Å	I	$E_{ m H}$, eV	E _B . eV	Transition	J
2125,272	1	19,87	25,70	4p ² P°-7s ⁴ P	3/2 - 3/2 $5/2 - 3/2$ $7/2 - 7/2$ $5/2 - 5/2$ $5/2 - 7/2$
2121,542	1	18,33	24,18	3d ⁴ P-(³ P ₂) 4f [2]°	
2121,306	2	18,49	24,34	3d ² F-(³ P ₁) 4f [3]°	
2119,985	3	18,33	24,18	3d ⁴ P-(³ P ₂) 4f [2]°	
2118,948	1	20,24	26,09	3d' ² F-(³ P ₂) 6f [3]°	
2117,934 2116,687 2115,090 2114,532 2110,896	1 5 1 1 2	19,97 17,63 17,94 18,45 18,29	25,82 23,48 23,80 24,31 24,16	$4p ^4S^{\circ} - 7s ^2P$ $3d ^4F - 5p ^4D^{\circ}$ $3d ^2P - 4p'' ^2P^{\circ}$ $4s' ^2D - (^3P_1) 4f [4]^{\circ}$ $3d ^4P - (^3P_2) 4f [3]^{\circ}$	3/2 - 3/2 $9/2 - 7/2$ $1/2 - 3/2$ $5/2 - 7/2$ $3/2 - 5/2$
2110,747 2109,046 2108,886 2108,068 2106,537	2 2 1 2 1	17,77 17,74 17,74 18,33 18,43	23,65 23,62 23,62 24,21 24,31	$\begin{array}{c} 3d\ ^{4}F-5p\ ^{4}D^{\circ}\\ 3d\ ^{4}F-5p\ ^{2}P^{\circ}\\ 3d\ ^{4}F-5p\ ^{2}D^{\circ}\\ 3d\ ^{4}P-(^{3}P_{2})\ 4f\ [1]^{\circ}\\ 4s'\ ^{2}D-(^{3}P_{1})\ 4f\ [2]^{\circ} \end{array}$	3/2 - 1/2 $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 3/2$ $3/2 - 3/2$
2106,247	1	18,45	24,34	$4s' {}^{2}D$ — $({}^{3}P_{1}) 4f [3]^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
2105,935	3	18,43	24,31	$4s' {}^{2}D$ — $({}^{3}P_{1}) 4f [2]^{\circ}$	
2104,885	3	18,29	24,18	$3d {}^{4}P$ — $({}^{3}P_{2}) 4f [2]^{\circ}$	
2103,353	5	18,29	24,18	$3d {}^{4}P$ — $({}^{3}P_{2}) 4f [2]^{\circ}$	
2101,467	1	19,80	25,70	$4p {}^{2}P^{\circ}$ — $7s {}^{4}P$	
2098,123	1	19,97	25,87	4p 4S°-6d 4P	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
2096,808	1	19,97	25,88	4p 2S°-7s 2P	
2095,976	1	18,43	24,34	4s' 2D-(3P ₁) 4f [3]°	
2092,764	3	18,25	24,18	3d 4P-(3P ₂) 4f [2]°	
2092,337	3	18,29	24,21	3d 4P-(3P ₂) 4f [1]°	
2091,627	5	18,29	24,21	$3d\ ^4P$ — $(^3P_2)\ ^4f\ [1]^\circ$	3/2 $3/2$ $3/2$ $3/2$ $3/2$ $5/2$ $3/2$ $3/2$ $5/2$ $1/2$ $1/2$
2087,718	1	19,76	25,70	$4p\ ^2D^\circ$ — $7s\ ^4P$	
2086,816	2	17,74	23,68	$3d\ ^4F$ — $5p\ ^2D^\circ$	
2082,109	3	18,43	24,38	$4s'\ ^2D$ — $(^3P_0)\ ^4f\ [3]^\circ$	
2080,357	5	18,25	24,21	$3d\ ^4P$ — $(^3P_0)\ ^4f\ [1]^\circ$	
2079,654	4	18,25	24,21	3d ⁴ P—(³ P ₂) ⁴ f [1]°	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
2076,178	2	19,97	25,94	4p ⁴ S°—6d ⁴ P	
2074,003	1	18,33	24,31	3d ⁴ P—(³ P ₁) ⁴ f [2]°	
2073,426	4	18,33	24,31	3d ⁴ P—(³ P ₁) ⁴ f [2]°	
2064,212	5	18,33	24,34	3d ⁴ P—(³ P ₁) ⁴ f [3]°	
2063,761	2	18,33	24,34	3d ⁴ P—(³ P ₁) ⁴ f [3]°	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2060,079	1	19,87	25,88	4p ² P°—7s ² P	
2059,190	1	19,68	25,70	4p ² D°—7s ⁴ P	
2058,087	3	18,29	24,31	3d ⁴ P—(³ P ₁) ⁴ f [2]°	
2057,514	5	18,29	24,31	3d ⁴ P—(³ P ₁) ⁴ f [2]°	
2050 ,794	5	18,33	24,38	3d ⁴ P—(³ P ₀) 4f [3]°	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
2050 ,324	2	18,33	24,38	3d ⁴ P—(³ P ₀) 4f [3]°	
2047 ,995	2	18,29	24,34	3d ⁴ P—(³ P ₁) 4f [3]°	
2046 ,492	4	18,25	24,31	3d ⁴ P—(³ P ₁) 4f [2]°	
2042 ,355	3	19,11	25,19	3d' ² G—5p' ² F°	
2039,490	3	19,11	25,19	3d' 2G-5p' 2F°	$ \begin{array}{c} 9/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2034,760	2	18,29	24,38	3d 4P-(3P ₀) 4f [3]°	
2032,173	3	18,06	24,16	3d 2P-(3P ₂) 4f [3]°	
2028,558	1	19,76	25,87	4p 2D°-6d 4F	
2026,602	2	18,06	24,18	3d 2P-(3P ₂) 4f [2]°	
2025,183 2024,733 2023,118 2022,73 2018,754	3 2 2 1 2	18,06 19,76 19,22 19,68 19,55 19,68	24,18 25,88 25,34 25,80 25,67 25,82	$3d^{2}P$ — $(^{3}P_{2})$ $4f$ [2]° $4p^{2}D^{\circ}$ — $7s^{2}P$ $4p^{4}P^{\circ}$ — $5d^{2}D$ $4p^{2}D^{\circ}$ — $6d^{4}F$ $4p^{4}D^{\circ}$ — $7s^{4}P$ $4p^{2}D^{\circ}$ — $7s^{2}P$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
2015,734 2015,319 2014,311 2007,178	2 1 1	19,55 18,06 19,76	25,70 24,21 25,94	4p ² D — 1s ² P 4p ⁴ D°—7s ⁴ P 3d ² P—(³ P ₂) 4f [1]° 4p ² D°—6d ⁴ P	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $

λ, λ	I	E_{H} , eV	E _B , eV	Transition	J
2004,914 2003,903	3 2	19,49 19,87	25,67 26,05	4p 4D°—7s 4P 4p 2P°—6d 2D	$\frac{7}{2}$ — $\frac{5}{2}$ $\frac{3}{2}$ — $\frac{5}{2}$
2003,325 2000,000	$\frac{1}{2}$	19,64 19,76	25,83 $25,96$	$4p ^4D^{\circ}$ —7s 4P $4p ^2D^{\circ}$ —6d 2F	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$
1988,620 1983,831	3 1	$ \begin{cases} 19,68 \\ 17,94 \\ 18,06 \end{cases} $	25,91 $24,18$	$4\hat{p}^{2}D^{\circ}-6d^{2}F$ $3d^{2}P-(^{3}P_{2}) 4f [2]^{\circ}$ $3d^{2}P-(^{3}P_{1}) 4f [2]^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
1983,296	1	18,06	24,31 24,31	$3d^{2}P - (^{3}P_{1}) 4f [2]^{\circ}$	$^{3}/_{2}$ — $^{5}/_{2}$
1981 ,74	1	19,49	25,75	$4p ^4D^{\circ} - 6d ^4D$?	7/2 - 7/2 $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$
1981 ,394	2	19,55	25,80	$4p ^4D^{\circ} - 6d ^4F$	
1979 ,988	1	19,61	25,87	$4p ^4D^{\circ} - 6d ^4F$	
1976 ,765	3	17,94	24,21	$3d ^2P - (^3P_2) 4f [1]^{\circ}$	
1974 ,467	3	18,06	24,34	$3d ^2P - (^3P_2) 4f [3]^{\circ}$	
1973,4837	2	13,48	19,76	$3p^{6} {}^{2}S - 4p {}^{2}D^{\circ}$	$1/_{2}$ $3/_{2}$ $7/_{2}$ $9/_{2}$ $1/_{2}$ $3/_{2}$ $3/_{2}$ $5/_{2}$ $1/_{2}$ $1/_{2}$
1972,270	2	19,49	25,78	$4p {}^{4}D^{\circ} - 6d {}^{4}F$	
1966,952	1	19,64	25,94	$4p {}^{4}D^{\circ} - 6d {}^{4}F$	
1962,164	3	18,06	24,38	$3d {}^{2}P - ({}^{3}P_{0}) {}^{4}f [3]^{\circ}$	
1961,3610	4	13,48	19,80	$3p^{6} {}^{2}S - 4p {}^{2}P^{\circ}$	
1946,800	2	17,94	24,31	3d ² P—(³ P ₁) 4f [2]°	$1/_2 - 3/_2$ $3/_2 - 5/_2$ $1/_2 - 3/_2$ $3/_2 - 3/_2$ $5/_2 - 7/_2$
1945,111	1	17,14	23,51	4s ² P—5p ⁴ D°	
1941,0724	3	13,48	19,87	3p ⁶ ² S—4p ² P°	
1937,042	1	17,77	24,18	3d ⁴ F—(³ P ₂) 4f [2]°	
1933,694	2	17,74	24,15	3d ⁴ F—(³ P ₂) 4f [4]°	
1932,231	2	17,74	24,16	3d ⁴ F-(³ P ₂) ⁴ f [3]°	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \\ 7/2 - 9/2 \end{array} $
1931,421	1	17,74	24,16	3d ⁴ F-(³ P ₂) ⁴ f [3]°	
1920,016	2	17,69	24,45	3d ⁴ F-(³ P ₂) ⁴ f [4]°	
1919,197	3	17,69	24,15	3d ⁴ F-(³ P ₂) ⁴ f [4]°	
1907,989	4	17,69	24,19	3d ⁴ F-(³ P ₂) ⁴ f [5]°	
1900,638	4	17,63	24,15	3d ⁴ F-(³ P ₂) ⁴ f [4] ^c	9/2 - 9/2 $9/2 - 7/2$ $5/2 - 7/2$ $9/2 - 11/2$ $3/2 - 5/2$
1899,834	1	17,63	24,15	3d ⁴ F-(³ P ₂) ⁴ f [4] ^c	
1899,271	1	19,22	25,75	4p ⁴ P°-(³ P ₂) ⁴ f [5] ^c	
1889,029	6	17,63	24,19	3d ⁴ F-(³ P ₂) ⁴ f [5] ^c	
1888,788	4	17,77	24,34	3d ⁴ F-(³ P ₁) ⁴ f [3] ^c	
1886,387	4	17,74	24,31	3d ⁴ F-(³ P ₁) 4f [4] ⁶	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \end{array} $
1879,788	2	17,74	24,34	3d ⁴ F-(³ P ₁) 4f [4] ⁶	
1879,419	1	17,74	24,34	3d ⁴ F-(³ P ₁) 4f [3] ⁶	
1877,523	4	17,77	24,38	3d ⁴ F-(³ P ₀) 4f [3] ⁶	
1873,140	6	17,69	24,31	3d ⁴ F-(³ P ₁) 4f [4] ⁶	
1872,582 1868,660 1866,093 1862,856 1834,039	$\frac{1}{3}$ $\frac{1}{1}$ $\frac{2}{2}$	17,69 17,74 17,69 16,75 16,64	24,34 24,38 24,34 23,40 23,40	$\begin{array}{c} 3d\ ^4F - (^3P_4)\ 4f\ [4]^\circ \\ 3d\ ^4F - (^3P_0)\ 4f\ [3]^\circ \\ 3d\ ^4F - (^3P_1)\ 4f\ [4]^\circ \\ 4s\ ^4P - 5p\ ^4P^\circ \\ 4s\ ^4P - 5p\ ^4P^\circ \end{array}$	7/2 - 7/2 $5/2 - 7/2$ $7/2 - 7/2$ $7/2 - 5/2$ $5/2 - 5/2$
1831,525	5	19,12	25,89	3d' ² G-(¹ D) 4f [5]°	7/2 - 9/2 $9/2 - 11/2$ $5/2 - 7/2$ $7/2 - 7/2$ $9/2 - 9/2$
1830,771	5	19,12	25,89	3d' ² G-(¹ D) 4f [5]°	
1823,207	1	18,62	25,42	3d ² F-(³ P ₂) 5f [3]°	
1813,772	1	19,12	25,95	3d' ² G-(¹ D) 4f [4]°	
1813,009	1	19,12	25,95	3d' ² G-(¹ D) 4f [4]°	
1791,561 1788,101 1785,669 1782,587 1776,670	1 3 1 1	18,49 18,49 18,62 18,62 16,42	25,42 25,43 25,56 25,57 23,40	3d ² F—(³ P ₂) 5f [3] ^c 3d ² F—(³ P ₂) 5/ [5] ^c 3d ² F—(³ P ₁) 5f [4] ^c 3d ² F—(³ P ₁) 5f [3] ^c 3d ⁴ D—5p ⁴ P ^c	b/2—1/2
1771,829	2	16,41	23,40	$3d\ ^4D - 5p\ ^4P^\circ$	$^{5}/_{2}$ $^{-3}/_{2}$
1770,652	1	18,62	25,62	$3d\ ^2F - (^3P_0)\ 5f\ [3]^\circ$	
1768,042	1	16,42	23,43	$3d\ ^4D - 5p\ ^4P^\circ$	
1755,810	1	18,49	25,56	$3d\ ^2F - (^3P_1)\ 5f\ [4]^\circ$	
1751,679	2	16,41	23,48	$3d\ ^4D - 5p\ ^4D^\circ$	

λ, Å	I	E_{H} , eV	$E_{_{f B}},\;{\sf eV}$	Transition	J
1736,830 1733,362 1729,262	1 1 1	18,29 18,29 18,25	25,43 $25,44$ $25,42$	3d ⁴ P — (³ P ₂) 5f [2]° 3d ⁴ P — (³ P ₂) 5f [1]° 3d ⁴ P — (³ P ₂) 5f [2]°	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
1729,075	1	18,73	25,90	$ \left\{ \begin{array}{l} 3d {}^{2}D - ({}^{1}D) 4f [2]^{\circ} \\ 3d {}^{2}D - ({}^{1}D) 4f [2]^{\circ} \end{array} \right. $	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
1725,138	1	18,25	25,44	$3d ^4P - (^3P_2) 5f [1]^\circ$	$^{1}/_{2}$ — $^{3}/_{2}$
1719,346	2	18,73	25,94	$ \left\{ \begin{array}{l} 3d \ ^{2}D - (^{1}D) \ 4f \ [3]^{\circ} \\ 3d \ ^{2}D - (^{1}D) \ 4f \ [3]^{\circ} \end{array} \right. $	5/2—7/2 5/2—5/2
1718,680 1713,215 1705,977 1702,186	$\begin{matrix}1\\2\\1\\1\end{matrix}$	16,41 18,33 18,29 18,33	23,62 $25,57$ $25,55$ $25,62$	$\begin{array}{c} 3d \ ^{4}D - 5p \ ^{2}D^{\circ} \\ 3d \ ^{4}P - (^{3}P_{1}) \ 5f \ [3]^{\circ} \\ 3d \ ^{4}P - (^{3}P_{1}) \ 5f \ [2]^{\circ} \\ 3d \ ^{4}P - (^{3}P_{0}) \ 5f \ [3]^{\circ} \end{array}$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1701,358	1	18,66	25,94	$3d^{2}D - (^{1}D) 4f [3]^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$
1662,253	1	18,49	25,95	$\begin{cases} 3d^{2}F - (^{1}D) & 4f & [4]^{\circ} \\ 3d^{2}F - (^{1}D) & 4f & [4]^{\circ} \end{cases}$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$
1653,322 1650,531 1649,299	1 1 1	17,94 18,06 18,43	25,44 $25,57$ $25,94$	3d ² P—(³ P ₂) ⁵ f [1] ° 3d ² P—(³ P ₁) ⁵ f [3] ° 4s' ² D—(¹ D) ⁴ f [3] °	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
1640,335 1629,834 1628,825 1616,972 1607,168	1 1 1 1	18,06 18,49 17,94 17,74 17,69	25,62 26,10 25,55 25,41 25,41	3d ² P—(³ P ₀) 5f [3]° 3d ² F—(³ P ₂) 6f [5]° 3d ² P—(³ P ₁) 5f [2]° 3d ⁴ F—(³ P ₂) 5f [4]° 3d ⁴ F—(³ P ₂) 5f [4]°	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 9/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \end{array} $
1606,927 1606,197 1604,083 1603,443 1603,074	4 3 5 4 4	16,44 16,46 16,42 16,44 16,42	24,16 24,18 24,15 24,18 24,16	3d ⁴ D—(³ P ₂) 4f [3]° 3d ⁴ D—(³ P ₂) 4f [2]° 3d ⁴ D—(³ P ₂) 4f [4]° 3d ⁴ D—(³ P ₂) 4f [2]° 3d ⁴ D—(³ P ₂) 4f [3]°	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
1602,893	2	17,69	25,43	$3d^{4}F$ — $(^{3}P_{2})$ $5f$ [5]°	$\frac{7}{2}$ $\frac{9}{5}$ $\frac{1}{2}$
1602,554	2	$\left\{\begin{array}{c} 16,44 \\ 16,42 \end{array}\right.$	24 ,18 24 ,16	$3d ^4D$ — $(^3P_2) ^4f [2]^\circ$ $3d ^4D$ — $(^3P_2) ^4f [3]^\circ$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
1600,694 1600,133 1599,597	6 4 1	16,41 16,41 16,42	24 ,15 24 ,15 24 ,18	$\begin{array}{c} 3d \ ^{4}D - (^{3}P_{2}^{2}) \ ^{4}f \ [4]^{\circ} \\ 3d \ ^{4}D - (^{3}P_{2}) \ ^{4}f \ [4]^{\circ} \\ 3d \ ^{4}D - (^{3}P_{2}) \ ^{4}f \ [2]^{\circ} \end{array}$	$\frac{7/2}{7/2} - \frac{9}{2}$ $\frac{7}{2} - \frac{7}{2}$ $\frac{5}{2} - \frac{3}{2}$
1599,125 1598,872 1598,724 1598,561 1596,141	1 1 2 1	16,41 16,46 16,42 16,41 16,44	24,16 24,21 24,18 24,16 24,21	3d ⁴ D—(³ P ₂) 4f [3]° 3d ⁴ D—(³ P ₂) 4f [1]° 3d ⁴ D—(³ P ₂) 4f [2]° 3d ⁴ D—(³ P ₂) 4f [3]° 3d ⁴ D—(³ P ₂) 4f [1]°	⁵ / ₂ — ⁵ / ₂
1595,734 1594,787 1593,581 1591,933 1590,229	1 1 2 1 2	16,44 16,41 17,63 16,42 17,77	24,21 24,18 25,41 24,21 25,57	$3d ^4D$ — $(^3P_2) ^4f [1]^\circ$ $3d ^4D$ — $(^3P_2) ^4f [2]^\circ$ $3d ^4F$ — $(^3P_2) ^5f [4]^\circ$ $3d ^4D$ — $(^3P_2) ^4f [1]^\circ$ $3d ^4F$ — $(^3P_4) ^5f [3]^\circ$	$\begin{array}{c} 7/2 - 5/2 \\ 9/2 - 9/2 \\ 5/2 - 3/2 \end{array}$
1589,463 1586,256 1583,83	5 2 1	17,63 17,74 17,74	25,43 25,56 25,57	3d ⁴ F—(³ P ₂) 5f [5]° 3d ⁴ F—(³ P ₄) 5f [4]° 3d ⁴ F—(³ P ₄) 5f [3]°	$\frac{9}{2}$ — $\frac{11}{2}$ $\frac{5}{2}$ — $\frac{7}{2}$ $\frac{5}{2}$ — $\frac{7}{2}$
1580,960	1	18,06	25,90	$ \begin{cases} 3d^{2}P - (^{1}D) (4f 2)^{\circ} \\ 3d^{2}P - (^{1}D) (4f 2)^{\circ} \\ 3d^{4}F - (^{3}D) (54 2)^{\circ} \end{cases} $	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
1580,768	2	17,77	25,62	$3d^{4}F - (^{3}P_{0})^{5}f^{5}[3]^{\circ}$	3/2 - 5/2
1578 ,812 1576 ,897 1575 ,815 1574 ,992 1574 ,402	3 3 6 1	16,46 17,69 16,44 13,48 17,74	24,31 25,56 24,31 21,35 25,62	$3d\ ^4D$ — $(^3P_1)\ 4f\ [2]^\circ$ $3d\ ^4F$ — $(^3P_1)\ 5f\ [4]^\circ$ $3d\ ^4D$ — $(^3P_1)\ 4f\ [2]^\circ$ $3p^6\ ^2S$ — $4p'\ ^2P'$ $3d\ ^4F$ — $(^3P_0)\ 5f\ [3]^\circ$	$\frac{7}{2} - \frac{9}{2}$
1571,390 1567,987 1566,812	1 4 1	16,42 16,41 16,42	24,31 24,31 24,34	3d ⁴ D—(³ P ₁) 4f [4]° 3d ⁴ D—(³ P ₁) 4f [4]° 3d ⁴ D—(³ P ₁) 4f [4]°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{9}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
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λ, Δ	I	E _H . eV	$E_{ m B}^{},~{ m eV}$	Transition	J
1565 ,377 1563 ,036	1	17,94 16,41	25,86 24,34	$ \left\{ \begin{array}{l} 3d\ ^2P - (^1D)\ 4f\ [1]^\circ \\ 3d\ ^2P - (^1D)\ 4f\ [1]^\circ \\ 3d\ ^4D - (^3P_1)\ 4f\ [4]^\circ \end{array} \right. $	$^{1/2}_{-1/2}$ $^{1/2}_{-1/2}$ $^{1/2}_{-1/2}$ $^{1/2}_{-1/2}$
1562,441 1560,184 1559,072 1557,302 1547,354	2 4 3 1	16,44 13,48 16,42 17,94 13,48	24,38 21,43 24,37 25,90 21,49	$\begin{array}{c} 3d\ ^4D - (^3P_0)\ 4f\ [3]^\circ \\ 3p^6\ ^2S - 4p'\ ^2P^\circ \\ 3d\ ^4D - (^3P_0)\ 4f\ [3]^\circ \\ 3d\ ^2P - (^1D)\ 4f\ [2]^\circ \\ 3p^6\ ^2S - 4p'\ ^2D^\circ \end{array}$	$\frac{3}{1/2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
1544,711 1544,177 1474,537 1472,594 1466,524	2 2 1 1 1	19,12 19,12 17,69 16,64 16,64	27,14 27,14 26,10 25,06 25,10	3d' ² G—(¹ D) 5f [5]° 3d' ² G—(¹ D) 5f [5]° 3d ⁴ F—(³ P ₂) 6f [5]° 4s ⁴ P—6p ⁴ P° 4s ⁴ P—6p ⁴ D°	$ \frac{\frac{7}{2} - \frac{9}{2}}{\frac{9}{2} - \frac{11}{2}} $ $ \frac{\frac{9}{2} - \frac{11}{2}}{\frac{7}{2} - \frac{9}{2}} $ $ \frac{\frac{5}{2} - \frac{5}{2}}{\frac{5}{2} - \frac{7}{2}} $
1465 ,153 1464 ,176 1463 ,155 1459 ,875 1455 ,484	1 1 2 1 1	17,63 17,77 17,63 17,74 17,77	26,09 26,24 26,10 26,23 26,29	3d ⁴ F-(³ P ₂) 6f [4]° 3d ⁴ F-(³ P ₁) 6f [3]° 3d ⁴ F-(³ P ₂) 6f [5]° 3d ⁴ F-(³ P ₁) 6f [4]° 3d ⁴ F-(³ P ₀) 6f [3]°	$\frac{9}{2} - \frac{11}{2}$ $\frac{5}{2} - \frac{7}{2}$ $\frac{3}{2} - \frac{5}{2}$
1451,879 1396,231 1382,765 1382,228 1380,723	1 1 2 1	17,69 17,63 16,46 16,44 16,44	26,23 26,51 25,42 25,41 25,42	$\begin{array}{c} 3d\ ^{4}F-(^{3}P_{1})\ 6f\ [4]^{\circ}\\ 3d\ ^{4}F-(^{3}P_{2})\ 7f\ [5]^{\circ}\\ 3d\ ^{4}D-(^{3}P_{2})\ 5f\ [2]^{\circ}\\ 3d\ ^{4}D-(^{3}P_{2})\ 5f\ [3]^{\circ}\\ 3d\ ^{4}D-(^{3}P_{2})\ 5f\ [2]^{\circ}\\ \end{array}$	$\begin{array}{c} 9/2 - 11/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
1379,884 1379,377 1377,211 1376,956 1363,031	3 1 4 1 2	16,42 16,42 16,41 16,41 16,46	25,41 25,41 25,41 25,41 25,55	$3d {}^{4}D - ({}^{3}P_{2}) 5f [4]^{\circ}$ $3d {}^{4}D - ({}^{3}P_{2}) 5f [3]^{\circ}$ $3d {}^{4}D - ({}^{3}P_{2}) 5f [4]^{\circ}$ $3d {}^{4}D - ({}^{3}P_{2}) 5f [4]^{\circ}$ $3d {}^{4}D - ({}^{3}P_{1}) 5f [2]^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \\ 1/2 - 3/2 \end{array} $
1360,735 1354,912 1351,330 1348,745 1284,793	1 2 1 1 1	16,44 16,41 16,44 16,42 16,44	25,55 25,56 25,62 25,62 26,09	3d ⁴ D-(³ P ₁) 5f [2] ⁶ 3d ⁴ D-(³ P ₁) 5f [4] ⁶ 3d ⁴ D-(³ P ₀) 5f [3] ⁶ 3d ⁴ D-(³ P ₀) 5f [3] ⁶ 3d ⁴ D-(³ P ₂) 6f [3] ⁶	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1282,620 1280,225 1268,483 932,0528 919,7815	1 1 1 10 10	16,42 16,41 16,46 0,18 0,00	26,09 26,09 26,23 13,48 13,48	$\begin{array}{c} 3d\ ^4D - (^3P_2)\ 6f\ [4]^5\\ 3d\ ^4D - (^3P_2)\ 6f\ [4]^6\\ 3d\ ^4D - (^3P_1)\ 6f\ [2]^6\\ 3p^5\ ^2P\ ^\circ - 3p^6\ ^2S\\ 3p^5\ ^2P\ ^\circ - 3p^6\ ^2S \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
762,200 754,824 748,198 745,323 744,925	3 3 4 7 8	0,18 0,00 0,18 0,18 0,00	16,44 16,42 16,75 16,81 16,64	$3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$	1/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$
740 ,270 737 ,457 730 ,929 725 ,550 723 ,361	10 1 5 4 5	0,00 0,00 0,18 0,18 0,00	16,75 16,81 17,14 17,26 17,14	$3p^{5} {}^{2}P^{\circ}$ — $4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$	3/2 - 3/2 $3/2 - 1/2$ $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 3/2$
718,091 704,523 698,771 697,940 697,489	4 4 4 2 2	0,00 0,18 0,00 0,18 0,00	17,26 17,77 17,74 17,94 17,77	$3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$	3/2 - 1/2 $1/2 - 3/2$ $3/2 - 5/2$ $1/2 - 1/2$ $3/2 - 3/2$
693,301 691,038 686,489 679,400 679,221	2 1 2 6 3	0,18 0,00 0,00 0,00 0,18 0,00	18,06 17,94 18,06 18,43 18,25	$3p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}P$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \end{array} $

	λ, Α	I	$E_{_{ m H}}$, eV	$E_{\rm B}$, eV	Transition	J
	677,951 676,241 672,856 671,852 670,948	5 6 2 6 5	0,00 0,00 0,00 0,00 0,00 0,18	18,29 18,33 18,43 18,45 18,66	$3p^{5} {}^{2}P^{\circ}$ — $3d {}^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $3d {}^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $4s' {}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
	666,010 664,563 661,869 612,371 602,858	6 4 5 5 2	0,00 0,00 0,00 0,00 0,18	18,62 18,66 18,73 20,24 20,74	$3p^{5} {}^{2}P^{\circ}$ — $3d {}^{2}F$ $3p^{5} {}^{2}P^{\circ}$ — $3d {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $3d {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $3d' {}^{2}F$ $3p^{5} {}^{2}P^{\circ}$ — $4s'' {}^{2}S$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
	597,701 583,437 580,264 578,604 578,107	2 2 3 2 2	0,00 0,18 0,00 0,00 0,18	20,74 21,43 21,37 21,43 21,62	$3p^{5} {}^{2}P^{\circ} - 4s'' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
	576,738 573,364 572,014 560,224 556,817	2 2 2 2 2	0,18 0,00 0,00 0,18 0,00	21,67 21,62 21,67 22,31 22,27	$3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
	555,764 553,123 550,896 550,481 548,781	1 1 1 1 2	0,00 0,18 0,18 0,18 0,00	22,31 22,59 22,68 22,70 22,59	$3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$	3/2 - 3/2 $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$ $3/2 - 3/2$
	547,456 547,166 546,175 543,730 543,205	2 2 2 2 2 2	0,18 0,18 0,00 0,00 0,00	22,82 22,84 22,70 22,80 22,82	$3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 4d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$	1/2 - 1/2 $1/2 - 1/2$ $3/2 - 3/2$ $3/2 - 1/2$ $3/2 - 1/2$
	542,911 537,140 533,082 530,494 526,497	2 1 1 1 1	0,00 0,00 0,00 0,00 0,18 0,00	22,84 23,08 23,26 23,55 23,55	$3p^{5} {}^{2}P^{\circ}-4d {}^{4}D$ $3p^{5} {}^{2}P^{\circ}-4d {}^{4}P$ $3p^{5} {}^{2}P^{\circ}-4d {}^{2}F$ $3p^{5} {}^{2}P^{\circ}-4d {}^{2}P$ $3p^{5} {}^{2}P^{\circ}-4d {}^{2}P$	3/2 - 1/2 $3/2 - 1/2$ $3/2 - 5/2$ $1/2 - 1/2$ $3/2 - 1/2$
	524,683 522,791 519,329 518,910 514,310	1 1 1 1	0,00 0,18 0,00 0,00 0,00 0,18	23,63 23,89 23,87 23,89 24,28	$3p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $4d {}^{2}D$ $3p^{5} {}^{2}P^{\circ}$ — $5s' {}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
	510,554 505,013 503,649 502,157 501,184	1 0,5 0,5 1 0,5	0,00 0,18 0,18 0,00 0,00	24,73 24,79 24,69 24,74	$ \left\{ \begin{array}{l} 3p^5 {}^2P^{\circ} - 5s' {}^2D \\ 3p^5 {}^2P^{\circ} - 5s' {}^2D \\ 3p^5 {}^2P^{\circ} - 4d' {}^2P \\ 3p^5 {}^2P^{\circ} - 4d' {}^2P \\ 3p^5 {}^2P^{\circ} - 6s {}^4P \\ 3p^5 {}^2P^{\circ} - 4d' {}^2D \end{array} \right. $	$\begin{array}{c} 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \end{array}$
	500,798 496,650 494,686 490,698 489,196 488,782	0,5 0,5 0,5 0,5 0,5 0,5	0,00 0,00 0,00 0,18 0,00 0,00	24,76 24,96 25,06 25,36 25,34 25,36	$\begin{array}{c} 3p^{5} \ ^{2}P^{\circ}-4d' \ ^{2}D \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{4}F ? \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{4}P ? \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{2}F ? \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{2}D \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{2}D \\ 3p^{5} \ ^{2}P^{\circ}-5d \ ^{2}D \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
37	76					- 4

Ar III, ground state $1s^2 2s^2 2p^6 3s^2 3p^4 ^3P_2$ Ionization potential $329 965,80 \text{ cm}^{-1}$; 40,908 eV

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λ, Α	I	E _{II} , eV	EB, eV	Transition	J
4198,83 4173,69 4149,03 4146,70 4127,19	3 2 3 5 4	25,73 25,75 25,73 25,69 25,73	28,68 28,72 28,72 28,68 28,73	$4s'' \ ^3P^{\circ} - 4p' \ ^3P$	$ \begin{array}{r} 1 - 2 \\ 0 - 1 \\ 1 - 1 \\ 2 - 2 \\ 1 - 0 \end{array} $
4098,19 4059,89 4023,60 3960,53 3907,84	4 3 6 8 7	25,69 26,60 26,57 26,53 26,60	28,72 29,65 29,65 29,65 29,77	$4s'' \ ^3P^{\circ} - 4p' \ ^3P$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3S$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3S$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3S$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3D$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 1-1 \\ 2-1 \\ 0-1 \end{array} $
3874,22 3858,32 3815,70 3800,25 3795,37	$egin{array}{c} 4 \\ 10 \\ 1 \\ 6 \\ 20 \\ \end{array}$	26,57 26,57 26,53 26,53 26,53	29,77 29,79 29,77 29,79 29,79	3d" 3P°-4p" 3D 3d" 3P°-4p" 3D 3d" 3P°-4p" 3D 3d" 3P°-4p" 3D 3d" 3P°-4p" 3D 3d" 3P°-4p" 3D	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 2 - 1 \\ 2 - 2 \\ 2 - 3 \end{array} $
3514,18 3511,69 3511,12 3509,33 3503,58	6 5 8 5 15	22,40 24,38 22,40 22,40 24,38	25,93 27,91 25,93 25,93 27,91	4s 3S°-4p 3P 4s' 3D°-4p' 3D 4s 3S°-4p 3P 4s 3S°-4p 3P 4s' 3D°-4p' 3D	$ \begin{array}{r} 1 - 1 \\ 3 - 2 \\ 1 - 2 \\ 1 - 0 \\ 2 - 2 \end{array} $
3502,70 3500,58 3499,67 3498,31 3497,10	$egin{array}{c} 6 \\ 5 \\ 12 \\ 6 \\ 4 \end{array}$	$24,38 \\ 24,37 \\ 24,37 \\ 26,60 \\ 26,57 \\ 26,23$	27,91 27,91 27,91 30,14 30,12 29,77	$4s' \ ^3D^{\circ} - 4p' \ ^3D$ $4s' \ ^3D^{\circ} - 4p' \ ^3D$ $4s' \ ^3D^{\circ} - 4p' \ ^3D$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3P$ $3d'' \ ^3P^{\circ} - 4p'' \ ^3D$ $3d'' \ ^3D^{\circ} - 4p'' \ ^3D$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 0-1 \\ 1-0 \\ 1-1 \end{array} $
3484,12 3480,55 3472,61 3471,32 3438,04	$\begin{array}{c} 3 \\ 20 \\ 6 \\ 9 \\ 8 \end{array}$	26,23 24,38 24,38 26,57 26,57	29,79 27,94 27,94 30,14 30,18	3d" 3D°-4p" 3D 4s' 3D°-4p' 3D 4s' 3D°-4p' 3D 3d" 3P°-4p" 3P 3d" 3P°-4p" 3P	$ \begin{array}{r} 1-2 \\ 3-3 \\ 2-3 \\ 1-1 \\ 1-2 \end{array} $
3430,03 3424,25 3417,49 3413,53 3391,85	2 9 7 6 15	26,16 26,53 26,16 26,16 26,53	29,77 30,14 29,79 29,79 30,18	3d" 3D°-4p" 3D 3d" 3P°-4p" 3P 3d" 3D°-4p" 3D 3d" 3D°-4p" 3D 3d" 3P°-4p" 3P	2-1 2-1 2-2 2-3 2-2
3361,28 3358,49 3352,11 3344,72 3336,13	7 15 4 20 25	24,38 24,37 24,38 24,38 24,38	28,06 28,06 28,08 28,08 28,10	4s' 3D°-4p' 3F 4s' 3D°-4p' 3F 4s' 3D°-4p' 3F 4s' 3D°-4p' 3F 4s' 3D°-4p' 3F	2—2 1—2 3—3 2—3 3—4
3327,34 3323,59 3311,25 3301,88 3285,85	4 9 15 20 25	26,06 26,06 21,62 21,62 21,62	29,79 29,79 25,36 25,37 25,39	3d" 3D°-4p" 3D 3d" 3D°-4p" 3D 4s 5S°-4p 5P 4s 5S°-4p 5P 4s 5S°-4p 5P	3-2 3-3 2-1 2-2 2-3
3187,90 3171,64 3157,42 3127,90 3110,41	6 2 5 7 7	26,23 25,75 25,73 25,69 26,16	30,12 29,65 29,65 29,65 30,14	3d" 3D°—4p" 3P 4s" 3P°—4p" 3S 4s" 3P°—4p" 3S 4s" 3P°—4p" 3S 3d" 3D°—4p" 3P	1-0 0-1 1-1 2-1 2-1
3083,64 3078,15 3064,77 3054,82 3036,96	3 10 10 12 3	26,16 25,75 25,73 25,73 25,69	30,48 29,77 29,77 29,79 29,77	3d" 3D°-4p" 3P 4s" 3P°-4p" 3D 4s" 3P°-4p" 3D 4s" 3P°-4p" 3D 4s" 3P°-4p" 3D	$ \begin{array}{r} 2-2 \\ 0-1 \\ 1-1 \\ 1-2 \\ 2-1 \end{array} $

λ, Ă	I	E _H , eV	E _B , eV	Transition	J
3027,16	5	25,69	29,79	$4s'' \ ^3P^{\circ} - 4p'' \ ^3D$ $4s'' \ ^3P^{\circ} - 4p'' \ ^3D$ $3d'' \ ^3D^{\circ} - 4p'' \ ^3P$ $4s'' \ ^3D^{\circ} - 4p' \ ^3P$ $4s'' \ ^3D^{\circ} - 4p' \ ^3P$	2—2
3024,05	12	25,69	29,79		2—3
3010,02	10	26,06	30,18		3—2
2884,12	9	24,38	28,68		3—2
2878,72	5	24,38	28,68		2—2
2876,65	1	24,37	28,68	$4s' \ ^3D^{\circ} - 4p' \ ^3P$	$ \begin{array}{r} 1 - 2 \\ 2 - 1 \\ 1 - 1 \\ 1 - 0 \\ 1 - 0 \end{array} $
2855,29	8	24,38	28,72	$4s' \ ^3D^{\circ} - 4p' \ ^3P$	
2853,23	6	24,37	28,72	$4s' \ ^3D^{\circ} - 4p' \ ^3P$	
2842,88	7	24,37	28,73	$4s' \ ^3D^{\circ} - 4p' \ ^3P$	
2824,66	6	25,73	30,12	$4s'' \ ^3P^{\circ} - 4p'' \ ^3P$	
2818,26 2807,02 2785,23 2783,65 2762,23	6 4 5 7	25,75 25,73 25,73 25,69 25,69	30,14 30,14 30,18 30,14 30,18	$4s'' \ ^3P^{\circ} - 4p'' \ ^3P$	0-1 $1-1$ $1-2$ $2-1$ $2-2$
2743,89	3	23,40	27,91	$3d' \ ^{3}D^{\circ}-4p' \ ^{3}D$	3-2
2724,84	10	23,40	27,94	$3d' \ ^{3}D^{\circ}-4p' \ ^{3}D$	3-3
2685,63	6	28,73	33,35	$4p' \ ^{3}P-4d' \ ^{3}D^{\circ}$	0-1
2678,38	9	23,29	27,91	$3d' \ ^{3}D^{\circ}-4p' \ ^{3}D$	2-2
2677,87	3	23,29	27,91	$3d' \ ^{3}D^{\circ}-4p' \ ^{3}D$	2-1
2676,46	4	28,72	33,35	$4p'\ ^3P-4d'\ ^3D^\circ \ 4p'\ ^3P-4d'\ ^3D^\circ \ 3d'\ ^3D^\circ-4p'\ ^3D-4d'\ ^3D^\circ \ 4p'\ ^3P-4d'\ ^3D^\circ$	1-1
2674,02	8	28,72	33,35		1-2
2660,22	3	23,29	27,94		2-3
2656,17	1	28,68	33,35		2-1
2654,63	10	28,68	33,35		2-3
2653,77 2645,47 2632,40 2631,90 2617,26	4 2 4 7 1	28,68 23,40 23,21 23,21 25,38	33,35 28,08 27,91 27,91 30,12	$4p'\ ^{3}P-4d'\ ^{3}D^{\circ}\ 3d'\ ^{3}D^{\circ}-4p'\ ^{3}F\ 3d'\ ^{3}D^{\circ}-4p'\ ^{3}D\ 3d'\ ^{3}D^{\circ}-4p'\ ^{3}D\ 3d'\ ^{3}S^{\circ}-4p''\ ^{3}P$	$ \begin{array}{c} 2-2 \\ 3-3 \\ 1-2 \\ 1-1 \\ 1-0 \end{array} $
2613,95	3	23,17	27,91	$3d' \ ^3F^{\circ} - 4p' \ ^3D$	2—2
2613,44	3	23,17	27,91	$3d' \ ^3F^{\circ} - 4p' \ ^3D$	2—1
2602,12	1	25,38	30,14	$3d' \ ^3S^{\circ} - 4p'' \ ^3P$	1—1
2597,25	3	23,14	27,91	$3d' \ ^3F^{\circ} - 4p' \ ^3D$	3—2
2594,41	1	23,29	28,08	$3d' \ ^3D^{\circ} - 4p' \ ^3F$	2—3
2583,39	3	25,38	30,18	$3d' \ ^{3}S^{\circ}-4p'' \ ^{3}P$	1—2
2580,17	2	23,14	27,94	$3d' \ ^{3}F^{\circ}-4p' \ ^{3}D$	3—3
2563,29	5	23,11	27,94	$3d' \ ^{3}F^{\circ}-4p' \ ^{3}D$	4—3
2533,92	3	23,17	28,06	$3d' \ ^{3}F^{\circ}-4p' \ ^{3}F$	2—2
2524,48	1	23,17	28,08	$3d' \ ^{3}F^{\circ}-4p' \ ^{3}F$	2—3
2518,26	2	23,14	28,06	$3d' \ ^3F^{\circ} - 4p' \ ^3F \ 3d' \ ^3F^{\circ} - 4p' \ ^3F \ 4p' \ ^3P - 4d' \ ^3P^{\circ} \ 4p' \ ^3P - 4d' \ ^3P^{\circ} \ 3d' \ ^3F^{\circ} - 4p' \ ^3F$	3-2
2508,91	3	23,14	28,08		3-3
2506,69	5	28,72	33,66		1-2
2504,42	4	28,73	33,68		0-1
2499,96	1	23,14	28,10		3-4
2496,40 2494,90 2492,95 2488,86 2485,63	5 6 3 12 2	28,72 28,72 23,11 28,68 28,08	33,68 33,68 28,08 33,66 33,07	$4p'\ ^3P-4d'\ ^3P^\circ \ 4p'\ ^3P-4d'\ ^3P^\circ \ 3d'\ ^3F^\circ-4p'\ ^3F \ 4p'\ ^3P^\circ-4d'\ ^3F^\circ \ 4p'\ ^3F-4d'\ ^3F^\circ \ $	$ \begin{array}{r} 1 - 1 \\ 1 - 0 \\ 4 - 3 \\ 2 - 2 \\ 3 - 2 \end{array} $
2484,87	2	28,10	33,09	$4p'\ ^3F-4d'\ ^3F^\circ \ 3d'\ ^3F^\circ-4p'\ ^3F \ 4p'\ ^3P-4d'\ ^3S^\circ \ 4p'\ ^3P-4d'\ ^3P^\circ \ 4p'\ ^3F-4d'\ ^3F^\circ$	4-3
2484,11	6	23,11	28,10		4-4
2479,76	3	28,73	33,73		0-1
2478,79	6	28,68	33,68		2-1
2476,55	6	28,06	33,07		2-2
2476,10 2472,95 378	7 8	$ \left\{ \begin{array}{c} 28,73 \\ 28,08 \\ 28,10 \end{array} \right. $	33,74 33,09 33,11	4p' 3P—5s' 3D° 4p' 3F—4d' 3F° 4p' 3F—4d' 3F°	0—1 3—3 4—4

				 	
λ, Å	I	E _H , eV	E _B , eV	Transition	J
2471,92	6	28,72	33,73	4p' 3P—4d' 3S°	1-1
2468,30	2	28,72	33,74	4p' 3P—5s' 3D°	1-1
2467,10	3	28,06	33,09	4p' 3F—4d' 3F°	2-3
2464,62	5	28,72	33,75	4p' ³ P-5s' ³ D°	1—2
2464,26	4	28,08	33,11	4p' ³ F-4d' ³ F°	3—4
2454,63	6	28,68	33,73	4p' ³ P-4d' ³ S°	2—1
2447,43	1	28,68	33,75	4p' ³ P-5s' ³ D°	2—2
2443,69	7	28,68	33,75	4p' ³ P-5s' ³ D°	2—3
2427,20	4	28,10	33,21	$4p'\ ^3F-4d'\ ^3G^\circ \ 4p\ ^5P-4d\ ^5D^\circ \ 4p\ ^5P-4d\ ^5D^\circ \ 4p\ ^5P-4d\ ^5D \ 4p'\ ^3F-4d'\ ^3G^\circ \ $	4—4
2424,49	2	25,39	30,50		3—2
2424,27	6	25,39	30,50		3—3
2423,93	12	25,39	30,50		3—4
2423,52	12	28,10	30,50		4—5
2421,81	4	28,08	33,20	$4p'\ ^3F-4d'\ ^3G^\circ \ 4p'\ ^3F-4d'\ ^3G^\circ \ 4p\ ^5P-4d\ ^5D^\circ \ 4p\ ^5P-4d\ ^5D^\circ \ 4p\ ^5P-4d\ ^5D^\circ \ $	3-3
2418,82	10	28,08	33,21		3-4
2416,00	3	25,37	30,50		2-1
2415,84	4	25,37	30,50		2-2
2415,61	7	25,37	30,50		2-3
2413,20	10	28,06	33,20	$4p' \ ^3F - 4d' \ ^3G^{\circ}$	2—3
2411,01	5	25,36	30,50	$4p \ ^5P - 4d \ ^5D^{\circ}$	1—1
2410,80	4	25,36	30,50	$4p \ ^5P - 4d \ ^5D^{\circ}$	1—2
2410,34	4	27,94	33,09	$4p' \ ^3D - 4d' \ ^3F^{\circ}$	3—3
2404,98	6	27,91	33,07	$4p' \ ^3D - 4d' \ ^3F^{\circ}$	1—2
2404,50	3	27,91	33,07	$4p'\ ^3D-4d'\ ^3F^\circ \ 4p'\ ^3D-4d'\ ^3F^\circ \ 4p'\ ^3D-4d'\ ^3P^\circ \ 4p'\ ^3F-4d'\ ^3D^\circ \ 4p'\ ^3F-4d'\ ^3D^\circ$	2—2
2399,15	12	27,94	33,11		3—4
2395,63	10	27,91	33,09		2—3
2360,26	9	28,10	33,35		4—3
2352,33	5	28,08	33,35		3—3
2351,67	7	28,08	33,35	$4p'\ ^3F-4d'\ ^3D^\circ \ 4p'\ ^3F-4d'\ ^3D^\circ \ 3d'\ ^3D^\circ-4p'\ ^3P \ 4p'\ ^3F-4d'\ ^3D^\circ \ 4p\ ^3P-4d\ ^3D^\circ$	3-2
2345,42	5	28,06	33,35		2-1
2345,17	9	23,40	28,68		3-2
2343,56	3	28,06	33,35		2-2
2319,37	10	25,93	31,27		2-2
2319,13	10	25,93	31 ,28	$4p\ ^3P-4d\ ^3D^\circ \ 4p\ ^3P-4d\ ^3D^\circ \ 4p\ ^3P-4d\ ^3D^\circ \ 4p\ ^3P-4d\ ^3D^\circ \ 4p\ ^3P-4d\ ^3D^\circ \ $	0-1
2318,35	2	25,93	31 ,28		2-1
2318,04	12	25,93	31 ,27		1-2
2317,47	15	25,93	31 ,28		2-3
2317,00	9	25,93	31 ,28		1-1
2302,92	6	25,93	31,31	$4p\ ^3P-5s\ ^3S^\circ \ 4p\ ^3P-5s\ ^3S^\circ \ 4p\ ^3P-5s\ ^3S^\circ \ 3d'\ ^3D^\circ-4p'\ ^3P \ 4s'\ ^3D^\circ-4p''\ ^3D$	0-1
2302,17	15	25,93	31,31		2-1
2300,85	10	25,93	31,31		1-1
2297,15	5	23,29	28,68		2-2
2296,24	4	24,38	29,77		2-1
2294,91	5	24,37	29,77	$4s'\ ^3D^{\circ}-4p''\ ^3D$	1-1
2294,05	3	24,38	29,79	$4s'\ ^3D^{\circ}-4p''\ ^3D$	3-2
2293,03	12	27,94	33,35	$4p'\ ^3D-4d'\ ^3D^{\circ}$	3-3
2292,39	5	27,94	33,35	$4p'\ ^3D-4d'\ ^3D^{\circ}$	3-2
2292,25	4	24,38	29,79	$4s'\ ^3D^{\circ}-4p''\ ^3D$	3-3
2290,61	6	24,38	29,79	$4s'\ ^3D^{\circ}$ — $4p''\ ^3D$	2-2
2289,31	4	24,37	29,79	$4s'\ ^3D^{\circ}$ — $4p''\ ^3D$	1-2
2288,82	2	24,38	29,79	$4s'\ ^3D^{\circ}$ — $4p''\ ^3D$	2-3
2282,21	7	23,29	28,72	$3d'\ ^3D^{\circ}$ — $4p'\ ^3P$	2-1
2281,22	7	27,91	33,35	$4p'\ ^3D$ — $4d'\ ^3D$	1-1
2280,85	5	27,91	33,35	$4p'\ ^3D-4d'\ ^3D$ $4p'\ ^3D-4d'\ ^3D^{\circ}$ $4p'\ ^3D-4d'\ ^3D^{\circ}$ $4p'\ ^3D-4d'\ ^3D^{\circ}$ $4p'\ ^3D-4d'\ ^3D^{\circ}$ $3d'\ ^3D^{\circ}-4p'\ ^3P$	2-1
2279,68	4	27,91	33,35		2-3
2279,47	3	27,91	33,35		1-2
2279,10	10	27,91	33,35		2-2
2248,73	7	23,21	28,72		1-1
					37°

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
2242,29	6	23,21	28,73	3d' 3D°-4p' 3P	$ \begin{array}{r} 1 - 0 \\ 4 - 3 \\ 3 - 2 \\ 2 - 1 \\ 3 - 2 \end{array} $
2192,06	15	28,10	33,75	4p' 3F-5s' 3D°	
2188,22	10	28,08	33,75	4p' 3F-5s' 3D°	
2184,06	8	28,06	33,74	4p' 3F-5s' 3D°	
2177,22	25	25,39	31,08	4p 5P-5s 5S°	
2470,23	20	25,37	31,08	$4p^{5}P - 5s^{5}S^{\circ}$	$ \begin{array}{c} 2-2 \\ 3-2 \\ 1-2 \\ 1-0 \\ 2-2 \end{array} $
2468,26	10	27,94	33,66	$4p'^{3}D - 4d'^{3}P^{\circ}$	
2466,49	15	25,36	31,08	$4p^{5}P - 5s^{5}S^{\circ}$	
2457,53	3	24,37	30,12	$4s'^{3}D^{\circ} - 4p''^{3}P$	
2456,38	3	27,91	33,66	$4p'^{3}D - 4d'^{3}P^{\circ}$	
2149,07	3	27,91	33,68	$4p'\ ^3D-4d'\ ^3P^\circ$	$ \begin{array}{c} 1-1 \\ 2-1 \\ 2-1 \\ 1-0 \\ 3-2 \end{array} $
2148,73	8	27,91	33,68	$4p'\ ^3D-4d'\ ^3P^\circ$	
2148,38	5	24,38	30,14	$4s'\ ^3D^\circ-4p''\ ^3P$	
2147,95	6	27,91	33,68	$4p'\ ^3D-4d'\ ^3P^\circ$	
2138,59	10	24,38	30,18	$4s'\ ^3D^\circ-4p''\ ^3P$	
2136,73	3	27,94	33,75	$4p'\ ^3D - 5s'\ ^3D^\circ$	3-2
2133,87	15	27,94	33,75	$4p'\ ^3D - 5s'\ ^3D^\circ$	3-3
2128,22	6	27,91	33,74	$4p'\ ^3D - 5s'\ ^3D^\circ$	1-1
2127,89	3	27,91	33,74	$4p'\ ^3D - 5s'\ ^3D^\circ$	2-1
2125,50	3	27,91	33,75	$4p'\ ^3D - 5s'\ ^3D^\circ$	1-2
2125,16	10	27,91	33,75	$4p'\ ^3D - 5s'\ ^3D^\circ$	2-2
2122,34	8	27,91	33,75	$4p'\ ^3D - 5s'\ ^3D^\circ$	2-3
1973,780	4	22,40	28,63	$4s\ ^3S^\circ - 4p'\ ^3P$	1-2
1962,74	2	22,40	28,72	$4s\ ^3S^\circ - 4p'\ ^3P$	1-1
1957,83	1	22,40	28,73	$4s\ ^3S^\circ - 4p'\ ^3P$	1-0
1919,515	4	19,47	25,93	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 2 - 1 \\ 2 - 2 \end{array} $
1918,667	4	19,47	25,93	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	
1918,06	1	19,47	25,93	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	
1915,564	7	19,46	25,93	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	
1914,653	3	19,46	25,93	$3d \ ^{3}D^{\circ}-4p \ ^{3}P$	
1914,398 1843,19 1839,43 1836,42 1675,637	9 2 3 5 4	19,45 — — — 17,96	25,93 — — — 25,36	$3d\ ^3D^{\circ}-4p\ ^3P$ 3d\ ^5D^{\circ}-4p\ ^5P	3—2 — — — — 2—1
1675,484	7	17,96	25,36	3d ⁵ D°-4p ⁵ P	1, 0—1
1673,425	7	17,96	25,37	3d ⁵ D°-4p ⁵ P	3—2
1673,241	3	17,96	25,37	3d ⁵ D°-4p ⁵ P	2—2
1673,14	1	17,96	25,37	3d ⁵ D°-4p ⁵ P	1—2
1669,671	7	17,97	25,39	3d ⁵ D°-4p ⁵ P	4—3
1669,304	5	17,96	25,39	3d ⁵ D°-4p ⁵ P	3-3
1669,10	1	17,96	25,39	3d ⁵ D°-4p ⁵ P	2-3
1468,006	2	19,47	27,91	3d ³ D°-4p′ ³ D	1-2
1467,841	3	19,47	27,91	3d ³ D°-4p′ ³ D	1-1
1465,712	3	19,46	27,91	3d ³ D°-4p′ ³ D	2-2
1465,532	2	19,46	27,94	$3d \ ^3D^{\circ}-4p' \ ^3D$	$ \left\{ \begin{array}{l} 2-1\\ 3-2\\ 2-3\\ 3-3\\ 0-1\\ 2-2 \end{array} \right. $
1460,234	2	19,46	27,94	$3d \ ^3D^{\circ}-4p' \ ^3D$	
1460,077	4	19,45	27,94	$3d \ ^3D^{\circ}-4p' \ ^3D$	
1205,95	1	4,12	14,23	$3p^4 \ ^1S-3p^5 \ ^3P^{\circ}$	
1002,095	3	1,74	14,11	$3p^4 \ ^1D-3p^5 \ ^3P^{\circ}$	
887,404	10	0,14	14,11	$3p^4 \ ^3P - 3p^5 \ ^3P^\circ$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 1-1 \\ 2-2 \\ 1-0 \end{array} $
883,179	9	0,19	14,23	$3p^4 \ ^3P - 3p^5 \ ^3P^\circ$	
879,622	8	0,14	14,23	$3p^4 \ ^3P - 3p^5 \ ^3P^\circ$	
878,728	12	0,00	14,11	$3p^4 \ ^3P - 3p^5 \ ^3P^\circ$	
875,534	9	0,14	14,30	$3p^4 \ ^3P - 3p^5 \ ^3P^\circ$	
871,099	10	0,00	14,23	$3p^{4} ^{3}P - 3p^{5} ^{3}P^{\circ} \ 3p^{4} ^{1}D - 3p^{5} ^{1}P^{\circ} \ 3p^{4} ^{1}D - 3d ^{3}D^{\circ}$	2—1
769,152	12	1,74	17,86		2—1
699,72	1	1,74	19,45		2—3

				Total	
λ. Α		E _{II} . eV	E _B , eV	Transition	J
697,74 695,537	$\frac{2}{6}$	$\begin{smallmatrix}0,19\\0,14\end{smallmatrix}$	17,96 17,96	$\frac{3p^4}{3P} \frac{^3P}{-3d} \frac{^5D}{^5D}$ ° $\frac{3p^4}{^3P} \frac{^3P}{-3d} \frac{^5D}{^5D}$ °	0-1 1-0, 1, 2
690 ,170 676 ,241 643 ,256 641 ,808	$\begin{matrix} 8 \\ 6 \\ 9 \\ 12 \end{matrix}$	0,00 $ 0,19$ $0,14$	17,96 19,47 19,46	$3p^4 \ ^3P - 3d \ ^5D^{\circ}$ $- 3p^4 \ ^3P - 3d \ ^3D^{\circ}$ $3p^4 \ ^3P - 3d \ ^3D^{\circ}$	2-1, 2, 3 - 0-1 1-2
641,364	5	0,14	19,47	$3p^{4} ^{3}P - 3d ^{3}D^{\circ}$	1—1
637,282 636,818 623,767 604,152 579,212	20 3 5 10 3	0,00 0,00 — — 1,74	19,46 19,47 — — 23,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3, 2 2—1 — — 2—3
578,386 577,153 573,468 558,321 556,893	4 3 4 5 6	1,74 0,14 0,00 0,19 0,14	23,17 21,62 21,62 22,40 22,40	$3p^{4} ^{1}D - 3d' ^{3}F^{\circ}$ $3p^{4} ^{3}P - 4s ^{5}S^{\circ}$ $3p^{4} ^{3}P - 4s ^{5}S^{\circ}$ $3p^{4} ^{3}P - 4s ^{3}S^{\circ}$ $3p^{4} ^{3}P - 4s ^{3}S^{\circ}$	2—2 1—2 2—2 0—1 1—1
553,470 538,788 537,459 536,745 535,580	9 6 6 8 7	0,00 0,19 0,14 - 0,14	22,40 23,21 23,21 - 23,29	$3p^{4} ^{3}P - 4s ^{3}S^{\circ}$ $3p^{4} ^{3}P - 3d' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d' ^{3}D^{\circ}$ - $3p^{4} ^{3}P - 3d' ^{3}D^{\circ}$	2—1 0—1 1—1 — 1—2
534,26 532,413 529,900 512,769 511,565	1 7 9 7 7	0,00 0,00 0,00 0,19 0,14	23,21 23,29 23,40 24,37 24,37	$3p^4 \ ^3P - 3d' \ ^3D^{\circ}$ $3p^4 \ ^3P - 3d' \ ^3D^{\circ}$ $3p^4 \ ^3P - 3d' \ ^3D^{\circ}$ $3p^4 \ ^3P - 4s' \ ^3D^{\circ}$ $3p^4 \ ^3P - 4s' \ ^3D^{\circ}$	2-1 2-2 2-3 0-1 1-1
511,497 508,655 508,595 508,434 492,228	8 2 4 9 3	0,14 $0,00$ $ 0,00$ $0,00$ $0,19$	24,38 24,37 — 24,38 25,38	$3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ - $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d' ^{3}S^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ - \\ 2-3 \\ 0-1 \end{array} $
491 ,121 490 ,68 488 ,452 487 ,988 487 ,025	4 3 7 7 7	0,14 0,00 —	25,38 — 25,38 —	$3p^{4} ^{3}P - 3d' ^{3}S^{\circ}$ $-3p^{4} ^{3}P - 3d' ^{3}S^{\circ}$ $-$	1—1 — 2—1 —
485,515 485,150 484,445 484,116 482,548	4 6 5 5 8	0,19 0,14 0,14 0,14 0,00	25,73 25,69 25,73 25,75 25,69	$3p^4 \ ^3P - 4s'' \ ^3P^{\circ} \ 3p^4 \ ^3P - 4s'' \ ^3P^{\circ}$	0-1 1-2 1-1 1-0 2-2
481,848 476,432 473,918 473,025 469,968	6 7 6 6 4	0,00 0,14 0,00 0,00 0,00	25,73 26,16 26,16 26,23 26,57	$3p^{4} ^{3}P - 4s'' ^{3}P^{c}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{c}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{c}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{c}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{c}$	2-1 1-2 2-2 2-1 0-1
469 ,831 468 ,956 468 ,467 467 ,390 466 ,530	4 3 4 6 5	0,14 0,14 0,14 0,00 0,00	26,53 26,57 26,60 26,53 26,57	$3p^4 \ ^3P - 3d'' \ ^3D^{\circ} \ 3p^4 \ ^3P - 3d'' \ ^3D^{\circ}$	1-2 1-1 1-0 2-2 2-1
398 ,86 397 ,67 396 ,38 395 ,92	1 1 4 1	0,00 0,14 0,00 0,00	31 ,08 31 ,31 31 ,28 31 ,31	$\begin{array}{c} 3p^4\ ^3P-5s\ ^5S^\circ \\ 3p^4\ ^3P-5s\ ^3S^\circ \\ 3p^4\ ^3P-4d\ ^3D^\circ \\ 3p^4\ ^3P-5s\ ^3S^\circ \end{array}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 2-3 \\ 2-1 \end{array} $

Ar IV, ground state $1s^2 2s^2 2p^6 3s^2 3p^{3} 4S^0_{3/2}$ Ionization potential 482400 cm^{-1} ; 59,806 eV

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λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
5838,01 5847,03 5830,04 5739,88 4922,50	- - - -	_ _ _ _	 	— — — —	_ _ _ _
4894,53 4871,78 4808,66 4697,87 4690,9	 	<u>-</u> 	_ _ _ _	- - - -	_ _ _ _
4639,36 4417,30 4364,80 4229,81 4182,97		_ _ _ _ _	_ _ _ _	_ _ _ _ _	_ _ _ _ _
4089,04 3908,43 3858,46 3800,42 3777,52	_ _ _ _	 	- - - -	_ _ _ _	_ _ _ _
3750,79 3713,19 3692,5 3424,43 3393,35	 	_ _ _ _	- 	_ _ _ _ _	_ _ _ _
3391,86 3324,78 3157,60 3134,90 3125,98				 4s ² P4p ⁴ P° 	
3077,40 3065,11 3039,75 3037,98 3016,15	8 - 6 5	31,91 — 31,91 31,75	35,93 — — 35,99 35,86	$4s ^{2}P-4p ^{4}P^{\circ}$ $ 4s ^{2}P-4p ^{2}D^{\circ}$ $4s ^{2}P-4p ^{4}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2985,04 2926,33 2918,28 2913,00 2874,40	$-\frac{1}{11}$ $\frac{3}{12}$ $\frac{6}{6}$	 31 ,75 31 ,24 31 ,91 31 ,24	35,99 35,49 36,16 35,55	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} - \\ 1/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ 5/_2 - 5/_2 \end{array} $
2851,94 2830,25 2809,44 2797,11 2788,96	4 10 16 7 14	31,11 31,11 31,24 31,02 31,11	35,45 35,49 35,65 35,45 35,55	$4s ^4P - 4p ^4D^{\circ}$ $4s ^4P - 4p ^4D^{\circ}$ $4s ^4P - 4p ^4D^{\circ}$ $4s ^4P - 4d ^4D^{\circ}$ $4s ^4P - 4p ^4D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
2785,39 2784,47 2782,92 2776,26 2757,92	12 3 10 14	33,24 33,24 31,02 33,24	37,70 37,70 34,49 37,74		$ \begin{array}{c}$
2682,63 2640,34 2626,32 2624,92 2621,36	9 15 2 12 12	31,24 31,24 33,24 33,24 33,24	35,86 35,93 37,97 37,97 37,98	4s ⁴ P—4p ⁴ P° 4s ⁴ P—4p ⁴ P° 4s' ² D—4p' ² D° 4s' ² D—4p' ² D° 4s' ² D—4p' ² D°	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $

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λ, Α	I	E _H , eV	E _B , eV	Transition	J
2619,98 2615,68 2611,24 2608,44 2608,06	6 12 3 7 10	33,24 31,11 31,24 31,91 31,11	37,98 35,85 35,99 36,66 35,86	$4s'\ ^2D - 4p'\ ^2D^\circ$ $4s\ ^4P - 4p\ ^4P^\circ$ $4s\ ^4P - 4p\ ^2D^\circ$ $4s\ ^2P - 4p\ ^2P$ $4s\ ^4P - 4p\ ^4P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2599,47 2569,53 2568,07 2562,17 2540,55	12 7 10 12 4	31,91 31,02 31,11 31,02 31,11	36,67 35,85 35,93 35,86 35,99	$4s^{2}P-4p^{2}P^{\circ}$ $4s^{4}P-4p^{4}P^{\circ}$ $4s^{4}P-4p^{4}P^{\circ}$ $4s^{4}P-4p^{4}P^{\circ}$ $4s^{4}P-4p^{2}D^{\circ}$	3/2 - 3/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$
2534,1 2525,69 2518,40 2517,28 2513,28	9 6 5 12	31,75 31,24 31,75 31,24	36,66 36,16 36,67 36,47	-4s ² P-4p ² P° 4s ⁴ P-4p ² D° 4s ² P-4p ² P° 4s ⁴ P-4p ⁴ S°	$\begin{array}{c} - \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
2496,93 2467,3 2452,58 2447,71 2407,20	$\frac{3}{4}$ $\frac{3}{8}$ 6	31,02 31,11 31,11 31,02	35,99 36,16 36,17 36,17	$4s ^4P - 4p ^2D^{\circ}$ $ 4s ^4P - 4p ^2D^{\circ}$ $4s ^4P - 4p ^4S^{\circ}$ $4s ^4P - 4p ^4S^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2368,15 2351,8 2345,4 2299,72 1197,84	3 - 4 1	31,91 — 31,75 4,34	37,14 — 37,14 14,69	$4s ^{2}P - 4p ^{2}S^{\circ}$ $ 4s ^{2}P - 4p ^{2}S^{\circ}$ $3p^{3} ^{2}P^{\circ} - 3p^{4} ^{4}P$	$^{3/2}_{-}^{-1/2}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-$
1190,354 1187,80 1037,931 901,804 901,168	2 1 1 2 9	4,34 4,32 2,63 4,34 4,34	14,76 14,76 14,58 18,09 18,10	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
900,362 850,602 843,772 840,029 801,913	5 25 20 15 5	4,32 0,00 0,00 0,00 2,63	18,09 14,58 14,69 14,76 18,09	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
801,409 801,086 800,573 761,470 760,439	10 10 5 5 3	2,63 2,61 2,61 4,34 4,32	18,10 18,09 18,10 20,62 20,62	$3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}D$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}P$	$ \begin{array}{r} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
755,212 754,205 700,277 699,408 689,007	3 4 8 6 12	4,34 4,32 4,34 4,32 2,63	20,76 20,76 22,05 22,05 20,62	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}S$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}S$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}P$	$ \frac{3}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{3}{2} $
688,392 683,278 399,634 398,546 396,869	7 40 3 4 4	2,61 2,61 0,00 0,00 0,00	20,62 20,76 31,02 31,11 31,24	$3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}P$ $3p^{3} {}^{2}D^{\circ} - 3p^{4} {}^{2}P$ $3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$	3/2 - 3/2 $3/2 - 1/2$ $3/2 - 1/2$ $3/2 - 3/2$ $3/2 - 5/2$ $3/3 - 5/2$

Ar V, ground state $1s^2 2s^2 2p^6 3s^2 3p^{2-3}P_0$ Ionization potential 605100 cm^{-1} ; 75,02 eV

	- Posser	••••	200 011		
λ, Å	I	E _H , eV	E _B , eV	Transition	J
836 ,126	2	0,25	15,08	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	2—1
835 ,792	1	0,25	15,09	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	2—2
834 ,878	4	0,25	15,10	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	2—3
827 ,349	3	0,09	15,08	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	1—1
827 ,055	5	0,09	15,09	$3p^2 \ ^3P - 3p^3 \ ^3D^\circ$	1—2
822,159 715,645 715,599 709,195 705,353	4 3 4 5 3	$ 0,00 \\ 0,25 \\ 0,25 \\ 0,09 \\ 0,00 $	15,08 17,58 17,58 17,58 17,58	$3p^2 \ ^3P - 3p^3 \ ^3D^9 \ 3p^2 \ ^3P - 3p^3 \ ^3P^\circ \ 3p^2 \ ^3P - 3p^3 \ ^3P^\circ \ 3p^2 \ ^3P - 3p^3 \ ^3P^\circ \ 3p^2 \ ^3P - 3p^3 \ ^3P^\circ$	0-1 2-2 2-1 1-1, 0 0-1
558,481	5	2,02	24,22	$3p^{2} {}^{1}D - 3p^{3} {}^{1}P^{\circ}$	2—1
527,693	6	0,25	23,75	$3p^{2} {}^{3}P - 3p^{3} {}^{3}S^{\circ}$	2—1
524,189	5	0,09	23,75	$3p^{2} {}^{3}P - 3p^{3} {}^{3}S^{\circ}$	1—1
522,090	3	0,00	23,75	$3p^{2} {}^{3}P - 3p^{3} {}^{3}S^{\circ}$	0—1
517,250	0	0,25	24,22	$3p^{2} {}^{3}P - 3p^{3} {}^{1}P^{\circ}$	2—1
513,914	1	0,09	24,22	$3p^{2} {}^{3}P - 3p^{3} {}^{1}P^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 2 - 2 \\ 2 - 1 \\ 1 - 2 \end{array} $
511,886	0	0,00	24,22	$3p^{2} {}^{3}P - 3p^{3} {}^{1}P^{\circ}$	
463,938	7	0,25	26,97	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
462,415	3	0,25	27,06	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
461,227	6	0,09	26,97	$3p^{2} {}^{3}P - 3d {}^{3}P^{\circ}$	
459,728	1	0,09	27,06	$3p^2 ^3P - 3d ^3P^{\circ}$	1-1
458,975	2	0,09	27,11	$3p^2 ^3P - 3d ^3P^{\circ}$	1-0
458,121	3	0,00	27,06	$3p^2 ^3P - 3d ^3P^{\circ}$	0-1
450,079	1	0,25	27,80	$3p^2 ^3P - 3d ^3D^{\circ}$	2-1
449,493	4	0,25	27,83	$3p^2 ^3P - 3d ^3D^{\circ}$	2-2
449,065	18	0,25	27,86	$3p^2 \ ^3P - 3d \ ^3D^\circ$	2-3
447,527	4	0,09	27,80	$3p^2 \ ^3P - 3d \ ^3D^\circ$	1-1
446,949	8	0,09	27,83	$3p^2 \ ^3P - 3d \ ^3D^\circ$	1-2
445,997	5	0,00	27,80	$3p^2 \ ^3P - 3d \ ^3D^\circ$	0-1
350,878	3	2,02	37,35	$3p^2 \ ^1D - 4s \ ^1P^\circ$	2-1
339,886 339,009 338,426 337,998 337,555 336,555	3 3 2 6 3 3	0,25 0,09 0,09 0,25 0,00 0,09	36,73 36,67 36,73 36,93 36,73 36,93	$3p^2 \ ^3P - 4s \ ^3P^\circ \ 3p^2 \ ^3P - 4s \ ^3P^\circ \ $	$ \begin{array}{c} 2-1 \\ 1-0 \\ 1-1 \\ 2-2 \\ 0-1 \\ 1-2 \end{array} $
,,,,,,,	J	σ, σ	JU, JJ	<i>δρ r</i> 4 <i>s - r</i>	1—2

Ar VI, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^{-2}P_{1/2}^0$ Ionization potential $736\ 600\ \text{cm}^{-1};\ 91,32\ \text{eV}$

λ, Å	I	E _{II} , eV	E _B , eV	Transition	J
767,71	1	0,27	16,42	$3p^{2}P^{\circ}-3p^{2}^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
767,06	2	0,27	16,44	$3p^{2}P^{\circ}-3p^{2}^{2}D$	
754,93	1	0,00	16,42	$3p^{3}P^{\circ}-3p^{2}^{2}D$	
596,694	4	0,27	21,05	$3p^{2}P^{\circ}-3p^{2}^{2}S$	
594,096	3	12,65	33,52	$3p^{2}^{4}P-3p^{3}^{4}S^{\circ}$	
589,783	2	12,50	33,52	$3p^{2} {}^{4}P - 3p^{3} {}^{4}S^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
588,921	5	0,00	21,05	$3p {}^{2}P^{\circ} - 3p^{2} {}^{2}S$	
587,006	1	12,40	33,52	$3p^{2} {}^{4}P - 3p^{3} {}^{4}S^{\circ}$	
555,639	4	0,27	22,59	$3p {}^{2}P^{\circ} - 3p^{2} {}^{2}P$	
551,371	8	0,27	22,76	$3p {}^{2}P^{\circ} - 3p^{2} {}^{2}P$	

λ, Å	I	E _H , eV	EB, eV	Transition	J
548,905	5	0,00	22,59	$3p ^{2}P^{\circ} - 3p^{2} ^{2}P$	1/2-1/2
544,731	4	0,00	22,76	$3p ^{2}P^{\circ} - 3p^{2} ^{2}P$	$^{1}/_{2}$ — $^{3}/_{2}$
466,932	4	12,65	39,20	$3p^2 ^4P - 3d ^4P^{\circ}$	$^{5}/_{2}^{-}$ $^{-5}/_{2}^{-}$
465,586	$\frac{2}{4}$	12,65	39,28	$3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$^{5}/_{2}$ — $^{3}/_{2}$
464,257	4	1 2,50	39,20	$3p^2 ^4P - 3d ^4P^{\circ}$	$^{3}/_{2}$ — $^{5}/_{2}$
462,146	4	$_{0}^{0},_{27}^{27}$	27,10	$3p^{2}P^{\circ}-3d^{2}D$	$^{3}/_{2}$ — $^{3}/_{2}$
462,007	25	0,27	27,11	$3p^{2}P^{\circ}-3d^{2}D$	$^{3/2}_{2}$ $^{-5/2}_{2}$
461,898	1	12,50	39,34	$3p^{2} 4P - 3d 4P^{5}$	$\frac{3}{2}$ $\frac{1}{2}$
461,227	6 1	$\frac{12,40}{42,40}$	39,28	$3p^{2} {}^{4}P - 3d {}^{4}P^{\circ}$	$\frac{1}{2}$ $\frac{-3}{2}$
460,202		12,40	39,34	$3p^{2} ^{4}P - 3d ^{4}P^{\circ}$	$^{1}/_{2}$ — $^{1}/_{2}$
460,058	1	12,65	39,60	$3p^{2} ^{4}P - 3d ^{4}D^{\circ}$	$^{5}/_{2}$ — $^{3}/_{2}$
459,603	3	12,65	39,62	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{5}{2}$ — $\frac{5}{2}$
459,320	10	12,65	39,64	$3p^2 4P - 3d 4D^{\circ}$	⁵ / ₂ — ⁷ / ₂
458,039	1	$\begin{array}{c} 12,50 \\ 0,00 \end{array}$	39,56	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ} 3p {}^{2}P^{\circ} - 3d {}^{2}D$	$\frac{3}{2}$ $\frac{1}{2}$
457 ,475	20	$\left\{\begin{array}{c} 0,00\\12,50\end{array}\right.$	$27,10 \\ 39,60$	$3p^{2} P - 3a P$ $3p^{2} P - 3d P$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
/F7 00 7	-			_	
457,007	5	12,50	39,62	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{3}{2} - \frac{5}{2}$
375, 456, 455, 813	$\frac{3}{2}$	$12,40 \\ 12,40$	$39,56 \\ 39,60$	$3p^{2} {}^{4}P - 3d {}^{4}D^{\circ} 3p^{2} {}^{4}P - 3d {}^{4}D^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$
294,052	$\frac{2}{6}$	0,27	42,44	$3p^{-3}P - 3a^{-3}D$ $3p^{-2}P^{\circ} - 4s^{-2}S$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
292,154	5	0,00	$\frac{42,44}{42,44}$	$3p^{-1}$ —43 B $3p^{-2}P^{\circ}$ —48 ^{2}S	$^{\prime}^{\prime}^{}}^{}}^{}^{}^{}}^{}}^{}}^{}}^{}^{}}^{}}^{}}^{}^{}}^{}}^{}}^{}}^{}}^{}}^{}}^{}^{}}^{}}$
			·	-	_
283,164	3 1	$12,50 \\ 12,50$	$56,28 \\ 56,37$	$3p^{2} {}^{4}P - 4s {}^{4}P^{\circ} 3p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$
282,556 282,423	6	$\frac{12,30}{12,65}$	56,55	$3p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
281,915	4	$\frac{12,00}{12,40}$	56,37	$3p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$
281,433	$\hat{3}$	12,50	56,55	$3p^{2} {}^{4}P - 4s {}^{4}P^{\circ}$	$3/2_2 - 5/2$
220,946	5	0,27	56,39	$3p ^2P^{\circ}-4d ^2D$	
219,896	3	$0,27 \\ 0,00$	56,38	$3p ^{2}P - 4d ^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
180,719	3	$0,00 \\ 0,27$	68,88	$3p^{-1}$ — $4a^{-1}D$ $3p^{-3}P^{\circ}$ — $5d^{-2}D$	$\frac{3}{2}$ $\frac{5}{2}$
180,074	$\overset{o}{2}$	0,00	68,85	$3p^{-1} - 5d^{-2}D$	$\frac{1}{2} \frac{1}{2} \frac{3}{2}$

Ar VII, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ ^1S_0$ Ionization potential $1\ 000\ 400\ {
m cm^{-1}};\ 124,03\ {
m eV}$

λ, Å	I	E _H , eV	EB, eV	Transition	J
644,388 641,318 637,466 637,052 634,208	2 2 1 4 2	14,33 14,12 14,12 14,33 14,02	33,57 33,45 33,57 33,79 33,57	$3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$ $3p \ ^{3}P^{\circ} - 3p^{2} \ ^{3}P$	2—1 1—0 1—1 2—2 0—1
630,306 585,754 479,485 479,379 475,733	$egin{pmatrix} 2 \\ 15 \\ 2 \\ 12 \\ 2 \end{pmatrix}$	14,12 0,00 14,33 14,33 14,12	33,79 21,17 40,19 40,19 40,18	$3p ^3P^{\circ} - 3p^2 ^3P$ $3s^2 ^1S - 3p ^1P^{\circ}$ $3p ^3P^{\circ} - 3d ^3D$ $3p ^3P^{\circ} - 3d ^3D$ $3p ^3P^{\circ} - 3d ^3D$	1-2 $0-1$ $2-2$ $2-3$ $1-1$
475,656 463,938 297,701 297,658 297,621	8 4 6 4 3	14,12 14,02 40,19 40,19 40,18	40,19 40,18 81,84 81,84 81,84	$3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3p \ ^{3}P^{\circ} - 3d \ ^{3}D$ $3p \ ^{3}D - 4f \ ^{3}F^{\circ}$ $3p \ ^{3}D - 4f \ ^{3}F^{\circ}$ $3p \ ^{3}D - 4f \ ^{3}F^{\circ}$	$ \begin{array}{c} 1-2 \\ 0-1 \\ 3-4, 3, 2 \\ 2-3, 2 \\ 1-2 \end{array} $
250 ,940 249 ,886 249 ,384	7 5 2	14,33 14,12 14,02	63,73 63,73 63,73	3p ³ P°—4s ³ S 3p ³ P°—4s ³ S 3p ³ P°—4s ³ S	2—1 1—1 0—1

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
192,635	7	14,33	78,69	3p ³ P°—4d ³ D	2—3
192,041	5	14,12	78,68	3p ³ P°—4d ³ D	1—2
191,759	3	14,02	78,67	$3p ^{3}P^{\circ}-4d ^{3}D$	0-1 $0-1$ $2-3$ $1-2$ $0-1$
176,566	10	0,00	70,22	$3s^{2} ^{1}S-4p ^{1}P^{\circ}$	
152,259	3	14,33	95,75	$3p ^{3}P^{\circ}-5d ^{3}D$	
151,876	2	14,12	95,75	$3p ^{3}P^{\circ}-5d ^{3}D$	
151,698	1	14,02	95,75	$3p ^{3}P^{\circ}-5d ^{3}D$	

Ar VIII, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^{\ 2} S_{1/2}$ Ionization potential 1 157 400 cm $^{-1}$; 143,49 eV

λ, λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
743,84 700,24 526,870 526,457 519,429	5 10 1 5 3	0,00 0,00 17,70 17,70 17,36	17,36 17,70 41,23 41,25 41,23	$3s ^2S - 3p ^2P^{\circ}$ $3s ^2S - 3p ^2P^{\circ}$ $3p ^2P^{\circ} - 3d ^2D$ $3p ^2P^{\circ} - 3d ^2D$ $3p ^2P^{\circ} - 3d ^2D$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
338,222 337,257 260,332 260,253 230,875	0 2 6 4 7	41,23 41,25 41,25 41,23 17,70	77,89 78,01 88,87 88,87 71,40	$3d^{2}D-4p^{2}P^{\circ} \ 3d^{2}D-4p^{2}P^{\circ} \ 3d^{2}D-4f^{2}F^{\circ} \ 3d^{2}D-4f^{2}F^{\circ} \ 3p^{3}P^{\circ}-4s^{2}S$	3/2 $ -1/2 $ $ 5/2 $ $ 3/2 $ $ 5/2 $ $ 7/2 $ $ 3/2 $ $ 5/2 $ $ 3/2 $ $ 5/2$
229,437 184,315 184,273 180,254 179,400	5 3 15 10	17,36 41,25 41,23 17,70 17,36	71,40 108,51 108,51 86,48 86,47	$3p \ ^3P^{\circ}-4s \ ^2S$ $3d \ ^2D-5f \ ^2F^{\circ}$ $3d \ ^2D-5f \ ^2F^{\circ}$ $3p \ ^2P^{\circ}-4d \ ^2D$ $3p \ ^2P^{\circ}-4d \ ^2D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 5/_{2} - 7/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
159,475 158,923 149,333 148,725 138,440	5 8 3 2 5	0,00 0,00 17,70 17,36 17,70	77,89 78,01 100,72 100,72 107,25	$3s^{2}S-4p^{2}P^{\circ} \ 3s^{2}S-4p^{2}P^{\circ} \ 3p^{2}P^{\circ}-5s^{2}S \ 3p^{2}P^{\circ}-5s^{2}S \ 3p^{2}P^{\circ}-5d^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
137,926 123,033 122,624 120,157 120,093	3 1 0 1 2	17,36 17,70 17,36 0,00 0,00	107,25 118,47 118,47 103,18 103,23	$3p \ ^{2}P^{\circ} - 5d \ ^{2}D$ $3p \ ^{2}P^{\circ} - 6d \ ^{2}D$ $3p \ ^{2}P^{\circ} - 6d \ ^{2}D$ $3s \ ^{2}S - 5p \ ^{2}P^{\circ}$ $3s \ ^{2}S - 5p \ ^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $

POTASSIUM, Z = 19 K I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 4s ^2S_{1/2}$ Ionization potential 35 009,78 cm⁻¹; 4,340 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J		
85100 84520 74260 64610 64310	10 10 10 10 10	$\begin{array}{c} 3,60 \\ 3,60 \\ 3,80 \\ 3,79 \\ 3,40 \\ 3,40 \end{array}$	3,74 3,74 3,96 3,96 3,60 3,60	$6p\ ^{2}P^{\circ}-5d\ ^{2}D$ $6p\ ^{2}P^{\circ}-5d\ ^{2}D$ $5g\ ^{2}G-6h\ ^{2}H^{\circ}$ $5f\ ^{2}F^{\circ}-6g\ ^{2}G$ $6s\ ^{2}S-6p\ ^{2}P^{\circ}$ $6s\ ^{2}S-6p\ ^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
62360 62030 40115,5 37370,7 37354,3	20 20 60 10 40	3,40 3,40 — — 3,06	3,60 3,60 — 3,40	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
37075 ,6 36626 ,4 36372 ,7 31596 ,8 31395	30 30 10 40 80	3,06 3,06 3,06 2,67 2,67	3,40 3,40 3,40 3,06 3,06	$5p ^{2}P^{\circ}$ — $4d ^{2}D$ $5p ^{2}P^{\circ}$ — $6s ^{2}S$ $5p ^{2}P^{\circ}$ — $6s ^{2}S$ $3d ^{2}D$ — $5p ^{2}P^{\circ}$ $3d ^{2}D$ — $5p ^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2, 5/2 - 3/2 \end{array} $		
27215,0 27065,6 15168,40 15163,08 13397,09	10 20 16 —	2,61 2,61 2,67 2,67 2,67	3,06 3,06 3,49 3,49 3,60	$5s^{2}S - 5p^{2}P^{\circ}$ $5s^{3}S - 5p^{2}P^{\circ}$ $3d^{2}D - 4f^{2}F^{\circ}$ $3d^{2}D - 4f^{2}F^{\circ}$ $3d^{2}D - 6p^{2}P^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 7/_{2} \\ 3/_{2} - 1/_{2} \end{array} $		
13377,86 12522,11 12432,24 11772,83 11769,62	15 16 17 16	2,67 1,62 1,61 1,62 1,62	3,60 2,61 2,61 2,67 2,67	$3d^{2}D-6p^{2}P^{\circ}$ $4p^{2}P^{\circ}-5s^{2}S$ $4p^{2}P^{\circ}-5s^{2}S$ $4p^{2}P^{\circ}-3d^{2}D$ $4p^{2}P^{\circ}-3d^{2}D$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $		
11690,21 11022,67 11019,87 10487,11 10482,15	17 16 17 8 5	1,61 2,67 2,67 2,67 2,67	2,67 3,80 3,80 3,85 3,85	$4p^{2}P^{\circ}-3d^{2}D \ 3d^{2}D-5f^{2}F^{\circ} \ 3d^{2}D-5f^{2}F^{\circ} \ 3d^{2}D-7p^{2}P^{\circ} \ 3d^{2}D-7p^{2}P^{\circ}$	1/2 - 3/2 $3/2 - 5/2$ $5/2 - 7/2$ $3/2 - 1/2$ $3/2 - 3/2$		
10479,63 9954,141 9949,668 9597,829 9595,704	9 5 6 14 15	2,67 2,61 2,61 2,67 2,67	3,85 3,85 3,85 3,96 3,96	$3d\ ^{2}D-7p\ ^{2}P^{\circ} \ 5s\ ^{2}S-7p\ ^{2}P^{\circ} \ 5s\ ^{2}S-7p\ ^{2}P^{\circ} \ 3d\ ^{2}D-6f\ ^{2}F^{\circ} \ 3d\ ^{2}D-6f\ ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $		
9351,590 9349,248 9347,235 8925,436 8923,312	6 3 7 4 5	2,67 2,67 2,67 2,61 2,61	4,00 4,00 4,00 4,00 4,00	$3d\ ^{2}D-8p\ ^{2}P^{\circ}\ 3d\ ^{2}D-8p\ ^{2}P^{\circ}\ 3d\ ^{2}D-8p\ ^{2}P^{\circ}\ 5s\ ^{2}S-8p\ ^{2}P^{\circ}\ 5s\ ^{2}S-8p\ ^{2}P^{\circ}$	3/2 - 1/2 $3/2 - 3/2$ $5/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$		
8904,017 8902,188 8767,053 8763,955 8505,112	12 13 3 4 10	2,67 2,67 2,67 2,67 2,67	4,06 4,06 4,08 4,08 4,13	$3d\ ^{2}D-7f\ ^{2}F^{\circ}\ 3d\ ^{2}D-7f\ ^{2}F^{\circ}\ 3d\ ^{2}D-9p\ ^{2}P^{\circ}\ 3d\ ^{2}D-9p\ ^{2}P^{\circ}\ 3d\ ^{2}D-8f\ ^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $		
8503,449 8419,996 8417,535 8391,44 8390,223	$\frac{11}{2}$	2,67 2,67 2,67 2,61 2,61	4,13 4,14 4,14 4,08 4,08	$3d^{2}D - 8f^{2}F^{\circ}$ $3d^{2}D - 10p^{2}P^{\circ}$ $3d^{2}D - 10p^{2}P^{\circ}$ $5s^{2}S - 9p^{2}P^{\circ}$ $5s^{2}S - 9p^{2}P^{\circ}$	5/2 - 7/2 $3/2 - 1/2$ $5/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$		
8251,743 8250,180 8079,618	8 9 6	2,67 2,67 2,67	4,17 4,17 4,20	$3d\ ^{2}D-9f\ ^{2}F^{\circ}\ 3d\ ^{2}D-9f\ ^{2}F^{\circ}\ 3d\ ^{2}D-10f\ ^{2}F^{\circ}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{5}{2} $		

λ, Å	I	E _H , eV	E _B , eV	Transition	J
8078 ,114 7956 ,832	7 4	$^{2,67}_{2,67}$	4,20 4,23	3d ² D—10f ² F° 3d ² D—11f ² F°	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{3}{2}$ $\frac{-5}{2}$
7955,371 7698,959 7664,899 6964,672 6964,18	5 24 25 12 7	2,67 0,00 0,00 1,62 1,62	4,23 1,61 1,62 3,40 3,40	$3d^{2}D-11f^{2}F^{\circ}$ $4s^{2}S-4p^{2}P^{\circ}$ $4s^{2}S-4p^{2}P^{\circ}$ $4p^{2}P^{\circ}-4d^{2}D$ $4p^{2}P^{\circ}-4d^{2}D$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
6938,767 6936,284 6911,084 5831,887 5812,148	20 12 19 17 15	1,62 1,61 1,61 1,62 1,61	3,40 3,40 3,40 3,74 3,74	$4p \ ^{2}P^{\circ}-6s \ ^{2}S$ $4p \ ^{2}P^{\circ}-4d \ ^{2}D$ $4p \ ^{2}P^{\circ}-6s \ ^{2}S$ $4p \ ^{2}P^{\circ}-5d \ ^{2}D$ $4p \ ^{2}P^{\circ}-5d \ ^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
5801,752 5782,384 5359,574 5342,970 5339,688	17 16 14 12 13	1,62 1,61 1,62 1,61 1,62	3,75 3,75 3,93 3,93 3,94	$4p^{2}P^{\circ}-7s^{2}S$ $4p^{2}P^{\circ}-7s^{2}S$ $4p^{2}P^{\circ}-6d^{2}D$ $4p^{2}P^{\circ}-6d^{2}D$ $4p^{2}P^{\circ}-8s^{2}S$	3/2 - 1/2 $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$
5323,276 5112,249 5099,200 5097,171 5084,226	12 12 11 11 10	1,61 1,62 1,62 1,61 1,61	3,94 4,04 4,05 4,04 4,05	$4p^{2}P^{\circ}-8s^{2}S$ $4p^{2}P^{\circ}-7d^{2}D$ $4p^{2}P^{\circ}-9s^{2}S$ $4p^{2}P^{\circ}-7d^{2}D$ $4p^{2}P^{\circ}-7d^{2}S$	$\begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array}$
4965,031 4956,146 4950,815 4942,015 4869,757	10 9 9 8 9	1,62 1,62 1,61 1,61 1,62	4,11 4,12 4,11 4,12 4,16	$4p ^{2}P^{\circ} - 8d ^{2}D$ $4p ^{2}P^{\circ} - 10s ^{2}S$ $4p ^{2}P^{\circ} - 8d ^{2}D$ $4p ^{2}P^{\circ} - 10s ^{2}S$ $4p ^{2}P^{\circ} - 9d ^{2}D$	3/2 - 5/2 $3/2 - 1/2$ $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$
4863 ,483 4856 ,090 4849 ,865 4804 ,348 4799 ,754	8 8 7 8 6	1,62 1,61 1,61 1,62 1,62	4,17 4,16 4,17 4,20 4,20	$4p \ ^{2}P^{\circ}-11s \ ^{2}S$ $4p \ ^{2}P^{\circ}-9d \ ^{2}D$ $4p \ ^{2}P^{\circ}-11s \ ^{2}S$ $4p \ ^{2}P^{\circ}-10d \ ^{2}D$ $4p \ ^{2}P^{\circ}-10d \ ^{2}D$ $4p \ ^{2}P^{\circ}-12s \ ^{2}S$	$\begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array}$
4791,049 4786,491 4757,389 4753,934 4744,345	7 5 7 5 6	1,61 1,61 1,62 1,62 1,61	4,20 4,20 4,22 4,22 4,22	$4p ^{2}P^{\circ}$ $-10d ^{2}D$ $4p ^{2}P^{\circ}$ $-12s ^{2}S$ $4p ^{2}P^{\circ}$ $-11d ^{2}D$ $4p ^{2}P^{\circ}$ $-13s ^{2}S$ $4p ^{2}P^{\circ}$ $-11d ^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
4740,914 4642,373 4641,876 4047,206 4044,136	4 11 10 17 18	1,61 0,00 0,00 0,00 0,00	4,22 2,67 2,67 3,06 3,07	$4p^{2}P^{\circ}$ — $13s^{2}S$ $4s^{2}S$ — $3d^{2}D$ $4s^{2}S$ — $3d^{2}D$ $4s^{2}S$ — $5p^{2}P^{\circ}$ $4s^{2}S$ — $5p^{2}P^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
3648,981 3648,841 3447,375 3446,372 3217,621	4 3 10 11 6	0,00 0,00 0,00 0,00 0,00	3,40 3,40 3,60 3,60 3,85	$4s^2S - 4d^2D$ $4s^2S - 4d^2D$ $4s^2S - 6p^2P^\circ$ $4s^2S - 6p^2P^\circ$ $4s^2S - 7p^2P^\circ$	$\begin{array}{c} 1/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array}$
3217 ,155 3102 ,043 3101 ,790 3034 ,920 3034 ,761	7 3 4 2 1	0,00 0,00 0,00 0,00 0,00	3,85 4,00 4,00 4,08 4,08	4s ² S-7p ² P° 4s ² S-8p ² P° 4s ² S-8p ² P° 4s ² S-9p ² P° 4s ² S-9p ² P°	$^{1/2}_{1/2}_{-1/2}^{-3/2}$ $^{1/2}_{1/2}_{-1/2}^{-1/2}$ $^{1/2}_{-1/2}^{-1/2}$ $^{1/2}_{-3/2}^{-3/2}$
2992 ,223 2992 ,118 888	1 1	0,00 0,00	4,14 4,14	4s ² S-10p ² P° 4s ² S-10p ² P°	$\frac{1}{2} \frac{1}{2} \frac{1}{2}$ $\frac{1}{2} \frac{3}{2}$

K II, ground state $1s^2 2s^2 2p^6 3s^2 3p^{6 1}S^0$ Ionization potential 256 637 cm⁻¹; 31,817 eV

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
6595,00 6427,96 6307,29 6246,59 6120,27	2 5 7 6 8	21 ,27 21 ,18 21 ,18 21 ,27	23 ,14 23 ,11 23 ,14 23 ,25	$3d [2^{1}/_{2}]^{\circ}$ — $4p [2^{1}/_{2}]$ $3d [3^{1}/_{2}]^{\circ}$ — $4p [2^{1}/_{2}]$ $3d [3^{1}/_{2}]^{\circ}$ — $4p [2^{1}/_{2}]$ $3d [3^{1}/_{2}]^{\circ}$ — $4p [1^{1}/_{2}]$ —	2-2 3-3 3-2 2-1
6012,41 5969,64 5772,32 5642,73 5536,01	1 2 4 5 3	21,27 20,64 21,18 21,27 20,47	23,33 22,71 23,33 23,46 22,71	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 3-2 \\ 2-1 \\ 0-1 \end{array} $
5512,69 5488,06 5470,13 5310,24 5056,27	2 2 6 5 7	21,27 24,15 20,45 21,18 20,26	23,51 26,41 22,71 23,51 22,71	$\begin{array}{c} 3d \ [2^{1}/_{2}]^{\circ} - 4p' \ [1^{1}/_{2}] \\ 4p' \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 3d \ [1^{1}/_{2}] - 4p \ [1^{1}/_{2}] \\ 3d \ [3^{1}/_{2}]^{\circ} - 4p' \ [1^{1}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 0-1 \\ 2-1 \\ 3-2 \\ 0-1 \end{array} $
5017,34 5005,60 4943,24 4938,75 4829,23	1 8 6 3 9	20,64 20,24 20,64 24,15 20,15	23,11 22,71 23,14 26,66 22,71	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [^{21}/_{2}] \\ 4s \ [^{11}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [^{21}/_{2}] \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4s \ [^{11}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 3 \\ 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 2 - 1 \end{array} $
4774,92 4659,38 4608,45 4595,65 4505,33	4 5 8 5 6	20,64 20,45 20,64 20,45 20,39	23,25 23,41 23,33 23,14 23,14	$\begin{array}{c} 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 3d \ [^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 1 - 2 \\ 2 - 2 \\ 1 - 2 \end{array} $
4466,65 4455,00 4423,73 4388,16 4383,80	5 2 3 7 1	20,47 23,57 20,45 20,64 23,53	23,25 26,35 23,25 23,46 26,35	$4s' \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1/1_2 \end{bmatrix}$ $4p' \begin{bmatrix} 1/2 \end{bmatrix} - 5s \begin{bmatrix} 11/2 \end{bmatrix}^{\circ}$ $3d \begin{bmatrix} 11/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 11/2 \end{bmatrix}$ $4s' \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 4p' \begin{bmatrix} 11/2 \end{bmatrix}$ $4p \begin{bmatrix} 1/2 \end{bmatrix} - 5s \begin{bmatrix} 11/2 \end{bmatrix}^{\circ}$	0-1 $1-2$ $2-1$ $1-1$ $0-2$
4374,87 4362,96 4340,03 4317,85 4309,10	1 3 5 2 7	23,51 20,39 - 20,64	26,35 23,25 — 23,51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} - \\ 2-2 \\ 1-1 \\ - \\ 1-2 \end{array}$
4305,265 4305,00 4288,70 4284,89 4263,40	1 7 4 3 7	23,53 20,45 20,64 23,51 20,24	26,41 23,33 23,53 26,41 23,14	$\begin{array}{c} 4p \ [^{1}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4p' \ [^{1}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 4s \ [^{1}/_{2}]^{\circ} - 4p \ [^{2}/_{2}] \end{array}$	0-1 $2-2$ $1-0$ $2-1$ $1-2$
4225,67 4222,97 4209,49 4186,24 4149,19	7 7 4 8 7	20,39 20,64 23,46 20,15 20,47	23,33 23,57 26,41 23,11 23,46	$3d [1/2]^{\circ}-4p [1^{1}/2]$ $4s' [1/2]^{\circ}-4p' [1/2]$ $4p' [1^{1}/2]-5s [1^{1}/2]$ $4s [1^{1}/2]^{\circ}-4p [2^{1}/2]$ $4s' [1/2]^{\circ}-4p' [1^{1}/2]$	1-2 1-1 1-1 2-3 0-1
4134,72 4114,99 4112,14 4093,69 4065,23	7 6 4 5 4	20,15 20,24 20,45 23,33 23,57	23,14 23,25 23,45 26,35 26,62	$\begin{array}{c} 4s \ [1^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p \ [1^{1}/_{2}] \\ 3d \ [1^{1}/_{2}]^{\circ} - 4p' \ [1^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5s' \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 1-1 2-1 2-2 1-0
4042,59 4039,69 4024,88 4017,52 4012,10	6 4 4 4 5	20,45 20,39 23,33 23,57 20,24	23,51 23,46 26,41 26,66 23,33	$3d [1^{1}/_{2}]^{\circ} - 4p' [1^{1}/_{2}]$ $3d [1^{1}/_{2}]^{\circ} - 4p' [1^{1}/_{2}]$ $4p [1^{1}/_{2}] - 5s [1^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}] - 5s' [1^{1}/_{2}]^{\circ}$ $4s [1^{1}/_{2}]^{\circ} - 4p [1^{1}/_{2}]$	2-2 1-1 2-1 1-1 1-2

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4001,24	7	20,47	23,57	$\begin{array}{c} 4s' \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 4p' \begin{bmatrix} 1/_2 \end{bmatrix} \\ 4s \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 11/_2 \end{bmatrix} \\ 4p \begin{bmatrix} 11/_2 \end{bmatrix} - 5s \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} \\ 3d \begin{bmatrix} 1/_2 \end{bmatrix}^{\circ} - 4p' \begin{bmatrix} 11/_2 \end{bmatrix} \\ 3d \begin{bmatrix} 11/_2 \end{bmatrix}^{\circ} - 4p' \begin{bmatrix} 11/_2 \end{bmatrix} \end{array}$	0—1
3995,10	6	20,15	23,25		2—1
3981,80	4	23,25	26,35		1—2
3972,58	6	20,39	23,51		1—2
3966,72	6	20,45	23,57		2—1
3959,84 3956,10 3955,21 3942,53 3934,46	3 3 6 6 5	23,53 23,57 20,39 23,51	26,66 26,71 23,53 26,66	$\begin{array}{c} 4p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ - \end{array}$	0-1 1-1 1-0 2-1
3926,36	5	23,25	26,41	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 5s \ [1^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4s \ [^{1}/_{2}]^{\circ} - 4p \ [^{1}/_{2}] \end{array}$	1—1
3923,00	5	23,46	26,62		1—0
3900,11	3	23,53	26,71		0—1
3899,28	3	20,39	23,57		1—1
3897,92	8	20,15	23,33		2—2
3886,84	2	23,57	26,76	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3d \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p \ [^{2^{1}}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \end{array}$	1-2
3883,42	3	23,51	26,71		2-1
3878,62	4	23,46	26,66		1-1
3873,74	5	20,26	23,46		0-1
3861,41	3	23,14	26,35		3-2
3844,02	1	20,24	23,46	$\begin{array}{c} 4s \left[1^{1}/_{2}\right]^{\circ} - 4p' \left[1^{1}/_{2}\right] \\ 4p' \left[1^{1}/_{2}\right] - 4d \left[1/_{2}\right]^{\circ} \\ 4p \left[2^{1}/_{2}\right] - 5s \left[1^{1}/_{2}\right]^{\circ} \\ 4p' \left[1^{1}/_{2}\right] - 4d \left[1^{1}/_{2}\right]^{\circ} \\ 4p \left[2^{1}/_{2}\right] - 5s \left[1^{1}/_{2}\right]^{\circ} \end{array}$	1-1
3821,30	3	23,46	26,71		1-1
3817,50	7	23,11	26,35		3-2
3816,56	6	23,51	26,76		2-2
3800,14	6	23,14	26,41		2-1
3783,19	6	20,24	23,51	$\begin{array}{c} 4s \left[1^{1}/_{2}\right]^{\circ} - 4p' \left[1^{1}/_{2}\right] \\ 4s \left[1^{1}/_{2}\right]^{\circ} - 4p \left[1^{1}/_{2}\right] \\ 4p' \left[1^{1}/_{2}\right] - 4d \left[1^{1}/_{2}\right]^{\circ} \\ 3d \left[1^{1}/_{2}\right]^{\circ} - 4p' \left[1^{1}/_{2}\right] \\ 4s \left[1^{1}/_{2}\right]^{\circ} - 4p' \left[1^{1}/_{2}\right] \end{array}$	1-2
3767,36	6	20,24	23,53		1-0
3756,62	3	23,46	26,76		1-2
3744,42	5	20,26	23,57		0-1
3739,13	5	20,15	23,46		2-1
3721,34	5	23,33	26,66	$\begin{array}{c} 4p \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4s \ [1^{1}/_{2}]^{\circ} - 4p' \ [1^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \end{array}$	2—1
3716,60	5	20,24	23,57		1—1
3681,54	6	20,15	23,51		2—2
3676,05	3	23,25	26,62		1—0
3668,60	3	23,35	26,71		2—1
3647,95	2	23,51	26,91	$4p' [1^{1}/_{2}] - 4d' [?]^{\circ}$ $4p [1^{1}/_{2}] - 5s' [^{1}/_{2}]^{\circ}$ $ 4s [1^{1}/_{2}]^{\circ} - 4p' [^{1}/_{2}]$ $4p [1^{1}/_{2}] - 4d [1^{1}/_{2}]^{\circ}$	2—2
3637,00	3	23,25	26,66		1—1
3626,42	4	—	—		—
3618,49	6	20,15	23,57		2—1
3608,88	5	23,33	26,76		2—2
3593,22	2	23,46	26,91	$\begin{array}{c} 4p' \ [1^{1}/_{2}] - 4d \ [?]^{\circ} \\ 4p \ [1^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [1^{1}/_{2}] - 4d \ [3^{1}/_{2}]^{\circ} \\ 4s' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \\ 4p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \end{array}$	1-2
3586,60	2	23,25	26,71		1-1
3562,15	4	23,51	26,99		2-3
3530,75	7	20,64	24,15		1-0
3529,53	3	23,25	26,76		1-2
3528,51	1	23,14	26,66	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 5s' \; [^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 4d \; [^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 4d \; [^{2}]^{\circ} \\ 4p' \; [^{1}/_{2}] - 4d \; [2^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 4d \; [1^{1}/_{2}]^{\circ} \end{array}$	2—1
3481,11	6	23,14	26,71		2—1
3457,85	2	23,33	26,91		2—2
3440,05	7	23,57	27,18		1—2
3427,13	2	23,14	26,76		2—2
3421,83 3416,76 3404,24 3392,63 3384,86	4 2 6 3 6		26,35 26,76 27,18	$\begin{array}{c} -\\ -\\ 4p \ [^{1}/_{2}] -5s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{2}/_{2}] -4d \ [^{1}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] -4d \ [^{2}/_{2}]^{\circ} \end{array}$	 1-2 3-2 2-2
3380,62 3373,60 3356,51	$\begin{matrix} 6 \\ 6 \\ 2 \end{matrix}$	23,33 - 22,71	26,99 - 26,41	$4p \ [1^{1/2}]$ — $4d \ [3^{1/2}]$ ° $-4p \ [^{1/2}]$ — $5s \ [1^{1/2}]$ °	2—3 — 1—1

λ, Å	I	E _H , eV	E _n , eV	Transition	J
3345,32 3337,67	6			- 4p' [1 ¹ / ₂]-4d [2 ¹ / ₂]°	_ 1—2
3301,60 3290,65 3258,81	3 5 3 3	20,39 23,14 23,11	24,15 26,91 26,91	$3d \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}]$ $4p \ [^{21}/_{2}] - 4d \ [^{?}]^{\circ}$ $4p \ [^{21}/_{2}] - 4d \ [^{?}]^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 2 - 2 \\ 3 - 2 \end{array} $
3253,98 3220,60	4	23,33	27,18	$4p \left[1^{1}/_{2}\right] - 4d \left[2^{1}/_{2}\right]^{\circ}$	2—2
3190,07 3189,28 3171,81 3169,80 3157,15	5 2 2 3 2	23 ,11 — 22 ,71 20 ,24 23 ,25	26,99 26,62 24,15 27,18	$4p [2^{1}/_{2}]$ — $4d [3^{1}/_{2}]$ ° — $4p [1/_{2}]$ — $5s' [1/_{2}]$ ° $4s [1^{1}/_{2}]$ °— $4p' [1/_{2}]$ $4p [1^{1}/_{2}]$ — $4d [2^{1}/_{2}]$ °	$ \begin{array}{c} 3-3 \\ -1 \\ 1-0 \\ 1-0 \\ 1-2 \end{array} $
3142,75 3105,00 3075,00 3062,18 3047,16	2 6 3 5 2	22,71 22,71 23,14 22,71 23,11	26,66 26,71 27,18 26,76 27,18	$\begin{array}{c} 4p \ [1/_2] - 4a \ [2/_2] \\ 4p \ [1/_2] - 5s' \ [1/_2] \circ \\ 4p \ [1/_2] - 4d \ [1/_2] \circ \\ 4p \ [2^1/_2] - 4d \ [2^1/_2] \circ \\ 4p \ [1/_2] - 4d \ [1^1/_2] \circ \\ 4p \ [2^1/_2] - 4d \ [2^1/_2] \circ \end{array}$	1-1 1-1 2-2 1-2 3-2
3030,43 2950,88 2808,99 2777,89 2743,55	2 2 3 2 4	23,57 23,46 23,25 22,71 23,14	27,66 27,66 27,66 27,18 27,66	$\begin{array}{c} 4p' \ [1/_2] - 4d' \ [11/_2]^{\circ} \\ 4p' \ [11/_2] - 4d' \ [11/_2]^{\circ} \\ 4p \ [11/_2] - 4d' \ [11/_2]^{\circ} \\ 4p \ [1/_2] - 4d \ [21/_2]^{\circ} \\ 4p \ [21/_2] - 4d' \ [11/_2]^{\circ} \end{array}$	1-1 1-1 1-1 1-2 2-1
2550,02 2504,60 2358,70 2342,30 2296,79	6 3 1 3 1	22,71 	27,66 — — —	4p [1/2]—4d' [11/2]° ————————————————————————————————————	1—1 — — —
2265,04 2255,29 2243,0 2210,53 2190,00	5 3 2 4 6	21 ,27 21 ,18 —	26,76 26,71 —	$\begin{array}{c} - \\ 3d \ \{2^{1}/_{2}\}^{\circ} - 4d \ [4^{1}/_{2}]^{\circ} \\ 3d \ [3^{1}/_{2}]^{\circ} - 4d \ [^{1}/_{2}]^{\circ} \\ - \\ - \\ - \end{array}$	2-2 3-1 -
2105,45 1764,0 1725,0 615,40 612,621	1 0 3 2 4	20,15 20,47 	27,18 27,66 20,24	$\begin{array}{c} - \\ 4s \left[1^{1}/_{2}\right]^{\circ} - 4d \left[2^{1}/_{2}\right]^{\circ} \\ 4s' \left[1^{1}/_{2}\right]^{\circ} - 4d' \left[1^{1}/_{2}\right]^{\circ} \\ - \\ 3p^{6} \left[S - 4s \left[1^{1}/_{2}\right]^{\circ} \end{array}$	2—2 0—1 — 0—1
607,931 600,765 574,634 550,323 546,123	5 6 1 1 3	0,00 0,00 —	20,39 20,64 — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 0-1 - - -
539,731 518,249 515,653 495,144 485,626	3 3 3 6 2	 	- - -	- - - -	 -
485,513 485,084 476,029 469,499 465,078	3 5 2 -	- 0,00 0,00	26,41 26,66	$\begin{array}{c} -\\ -\\ -\\ 3p^{6} {}^{1}S - 5s [1^{1}/_{2}]^{\circ} \\ 3p^{6} {}^{1}S - 5s' [^{1}/_{2}]^{\circ} \end{array}$	- - 0-1 0-1
446,830 441,812 429,923 429,656 261,200 261,028	5 5 3 1 1	 	 	- - - - -	- - - - -

K III, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^{5/2}P_{3/2}^0$ Ionization potential $369\ 000\ {\rm cm^{-1}};\ 45,747\ {\rm eV}$

		, -	.,		
λ, Å	I	E _H , eV	E _B , eV	Transition	J
3885,501 3513,88 3481,11 3468,32 3421,83	1 5 6 6 4	26,37 25,97 26,37 25,87 26,56	29,56 29,50 29,93 29,45 30,48	$4s^{2}P-4p^{4}P^{\circ}$ $4s^{4}P-4p^{4}P^{\circ}$ $4s^{2}P-4p^{4}D^{\circ}$ $4s^{4}P-4p^{4}P^{\circ}$ $4s^{2}P-4p^{4}P^{\circ}$ $4s^{2}P-4p^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3420,82 3364,22 3322,40 3289,06 3278,79	6 6 6 6	25,87 26,56 25,72 26,37 25,72	29,50 30,24 29,45 30,14 29,50	4s ⁴ P — 4p ⁴ P° 4s ² P — 4p ² P° 4s ⁴ P — 4p ⁴ P° 4s ² P — 4p ² D° 4s ⁴ P — 4p ⁴ P°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3209,34 3201,95 3956,84 3052,07 2992,24	6 6 5 6	26,56 26,37 25,97 25,87 25,72	30,42 30,24 30,02 29,93 29,86	4s ² P-4p ² P° 4s ² P-4p ² P° 4s ⁴ P-4p ⁴ D° 4s ⁴ P-4p ⁴ D° 4s ⁴ P-4p ⁴ D°	1/2 - 1/2 $3/2 - 3/2$ $1/2 - 3/2$ $3/2 - 5/2$ $5/2 - 7/2$
2986 ,20 2948 ,94 2938 ,45 2898 ,90 2736 ,96	5 0 5 1 0	25,87 26,37 25,72 25,97 25,72	30,02 30,58 29,93 30,24 30,24	$4s ^4P - 4p ^4D^{\circ} \ 4s ^2P - 4p ^4S^{\circ} \ 4s ^4P - 4p ^4D^{\circ} \ 4s ^4P - 4p ^2P^{\circ} \ 4s ^4P - 4p ^2P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2689,90 2635,11 2550,02 874,045 873,865	5 5 6 3 2	25,97 25,87 25,72 —	30,58 30,58 30,58 —	4s ⁴ P—4p ⁴ S° 4s ⁴ P—4p ⁴ S° 4s ⁴ P—4p ⁴ S° —	$^{1}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-3}/_{2}$ $^{5}/_{2}$ $^{-3}/_{2}$ $^{-}$
872,313 778,528 765,644 765,314 708,838	4 7 6 4 4	0,27 0,00 —	16,19 16,19 —	$\begin{array}{c} - \\ 3p^5 \ ^2P^{\circ} - 3p^6 \ ^2S \\ 3p^5 \ ^2P^{\circ} - 3p^6 \ ^2S \\ - \\ - \\ - \end{array}$	-1/2 - 1/2 3/2 - 1/2
696,202 695,820 582,140 529,796 527,565	1 3 1 8 1		23,67	$3p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$	
523,792 520,611 515,514 514,943 497,104	5 10 4 2 15	0,00 0,00 — — 0,00	23,67 23,81 — — 24,94	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \\ - \\ 3/_2 - 5/_2 \end{array} $
484,200 483,972 482,408 482,107 480,965	1 3 2 2 1	0,27 	25,87 25,97 25,72	$3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $- \\ 3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $- \\ - \\ - $	$^{1/2}$ $^{1/2}$ $^{3/2}$ $^{1/2}$ $^{1/2}$ $^{1/2}$ $^{3/2}$ $^{5/2}$
479,185 474,920 471,569 470,089 466,793	8 9 15 20 15	0,00 0,27 0,27 0,00 0,00	25,87 26,37 26,56 26,37 26,56	$3p^{5} {}^{2}P^{\circ}$ — $4s^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s^{2}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s^{2}P$	3/2 - 3/2 $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 3/2$ $3/2 - 1/2$
448,595 444,344 442,913 442,043 440,429	15 15 3 2 15	0,27 0,00 — —	27,91 27,90 — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/2—3/2 3/2—5/2 —————————————————————————————————

λ, Å	I	E _H , eV	E _B , eV	Transition	J
438,869 437,216 435,676 434,722 418,623	4 3 10 15 6			$\begin{array}{c} - \\ - \\ - \\ - \\ - \\ 3p^5 \ ^2P ^{\circ} - 3d' \ ^2P \end{array}$	$ 1/_2-^{3/}_2$
417,535 416,001 414,870 413,792 412,289	6 6 10 5	0,27 0,27 0,00 0,00 0,00	29,96 30,07 29,88 29,96 30,07	$3p^{5} {}^{2}P^{\circ} - 4s'' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 4s'' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}P$	1/2 - 1/2 $1/2 - 1/2$ $3/2 - 3/2$ $3/2 - 1/2$ $3/2 - 1/2$
410,102 409,737 408,959 406,484 402,907	8 8 8 6 6	0,27 0,00 0,00 —	30,50 30,32 30,50 	$3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $ 3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $-$	$^{1/2}_{2}$ $^{3/2}_{2}$ $^{3/2}_{2}$ $^{5/2}_{3/2}$ $^{3/2}_{2}$
402,104 400,210 398,633 396,763 391,918	4 8 3 0 4	0,27 0,27 0,00 0,00	31,10 31,25 31,10 31,25	$3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 1$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 1$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} \\ $
390 ,114 387 ,372 382 ,229 380 ,477 379 ,877	5 2 6 5 6		- 32,70 32,58 -	$3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $-$	$-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{1}{2}$ $-\frac{3}{2}$ $-\frac{3}{2}$
379,118 347,999 345,545 345,405 345,197	8 3 2 2 2	0,00 0,27 0,00 0,00	32,70 35,89 35,88 35,89 —	$3p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$ $-$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
344,635 344,270 341,924 331,416 330,684	4 4 6 1 5		- - 37,68 37,49	$3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D \ 3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$	- $ -$
329,053 328,933 328,845 327,605 325,278	2 3 2 1 0	0,00 <u> </u>	37,68 — 38,11 38,11	$3p^{5} {}^{2}P^{\circ} - 3d'' {}^{2}D$ $ 3p^{5} {}^{2}P^{\circ} - 2$ $3p^{5} {}^{2}P^{\circ} - 2$	$^{3/2}_{2}$ $^{3/2}_{2}$ $^{1/2}_{2}$ $^{3/2}_{2}$
240,758 239,010 203,890 203,823	3 2 3 2	- - -		_ _ _ _	_ _ _ _

K IV, ground state $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4\ ^3P_2$ Ionization potential 491 300 cm $^{-1}$; 60,909 eV

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
1025,742 892,621	3		_	_	
855,815 754,673 754,194	2 8 3	0,21 4,78	16,64 21,22	$-4p^4~^3P-3p^5~^3P^\circ \ 3p^4~^1S-3p^5~^1P^\circ$	$\begin{array}{c} - \\ 1-2 \\ 0-1 \end{array}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
749,993 746,350 745,264 741,950 737,144	6 8 10 10	0,29 0,21 0,00 0,21 0,00	16,82 16,82 16,64 16,92 16,82	$3p^4 \ ^3P - 3p^5 \ ^3P^{\circ}$ $3p^4 \ ^3P - 3p^5 \ ^3P^{\circ}$	0-1 $1-1$ $2-2$ $1-0$ $2-1$
725,848 705,641 687,495 672,941 646,188	1 3 6 5 15			- $ -$	
605,908 605,316 591,434 591,311 591,237	1 1 1 1	 	 	 	
543,973 543,640 528,879 527,617 527,064	1 2 1 3 2	0,29 0,21 0,21	16,92 23,70 23,73	$\begin{array}{c} -\\ -\\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \end{array}$	 01 12 11
526,448 523,001 506,029 505,761 500,125	4 5 2 1 3	0,00 0,00 	23,55 23,70 — — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 2—2 — — —
500,047 499,993 485,359 456,328 445,607	2 2 2 8 4		27,58 29,20 28,03	$\begin{array}{c} -\\ -\\ 3p^4 ^1D - 3d' ^1F^\circ \\ 3p^4 ^1D - 3d' ^1P^\circ \\ 3p^4 ^3P - 3d' ^3P^\circ \end{array}$	2-3 2-1 1-1
443,567 442,518 442,300 440,905 417,280	6 2 4 4 3	0,00 0,21 0,00 — 2,03	27,95 28,22 28,03 — 31,74	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2 1-0 2-1 - 2-2
408,076 405,773 404,412 393,142 392,467	5 2 3 10 4	2,03 2,03 2,03 0,21 0,29	32,41 32,59 32,69 31,74 31,88	$3p^{4} ^{1}D - 3d'' ^{1}P^{\circ}$ $3p^{4} ^{1}D - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-1 \\ 1-2 \\ 0-1 \end{array} $
392,274 391,462 390,574 390,415 389,069	2 4 6 5 5	4,78 0,21 0,00 0,29 2,03	36,38 31,88 31,74 31,96 33,90	$3p^{4} {}^{1}S - 4s'' {}^{3}P^{\circ}$ $3p^{4} {}^{3}P - 3d'' {}^{3}P^{\circ}$ $3p^{4} {}^{3}P - 3d'' {}^{3}P^{\circ}$ $3p^{4} {}^{3}P - 3d'' {}^{3}P^{\circ}$ $3p^{4} {}^{1}D - 3d'' {}^{1}D^{\circ}$	0-1 $1-1$ $2-2$ $1-0$ $2-2$
388,920 384,956 384,095 382,906 382,646	3 5 6 4	0,00 0,21 0,00 0,21 0,29	31,88 32,41 32,28 32,59 32,69	$3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 4s ^{3}S^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-1 \\ 1-2 \\ 0-1 \end{array} $
382,487 381,702 380,477 379,279 375,955	3 4 5 2 6	$ \left\{ \begin{array}{l} 2,03 \\ 0,00 \\ 0,21 \\ 0,00 \\ 0,00 \\ 2,03 \end{array} \right. $	34,45 32,41 32,69 32,59 32,69 35,01	$3p^{4} ^{1}D - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 4s' ^{1}D^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 1-1 \\ 2-2 \\ 2-1 \\ 2-2 \end{array} $
363,021 362,154 362,085	3 3 5	0,29 0,21 0,21	34,44 34,44 34,45	$3p^4 \ ^3P - 4s' \ ^3D^{\circ} \ 3p^4 \ ^3P - 4s' \ ^3D^{\circ} \ 3p^4 \ ^3P - 4s' \ ^3D^{\circ}$	0-1 $1-1$ $1-2$

λ, Å	1	E _H , eV	E _B , eV	Transition	J
360,568 359,907	2 4	2,03 0,00	36,41 34,45	3p ⁴ 1D—4s" 3p° 3p ⁴ 3P—4s' 3D°	2—2 2—1, 2
359,730 356,260 354,927 354,139 343,468	${6\atop 3\atop 6\atop 2\atop 3}$	0,00 0,21 2,03 0,00 0,29	34,46 35,01 36,96 35,01 36,38	$3p^4 \ ^3P - 4s' \ ^3D^{\circ}$ $3p^4 \ ^3P - 4s' \ ^1D^{\circ}$ $3p^4 \ ^1D - 4s'' \ ^1P^{\circ}$ $3p^4 \ ^3P - 4s' \ ^1D^{\circ}$ $3p^4 \ ^3P - 4s'' \ ^3P^{\circ}$	$ \begin{array}{r} 2-3 \\ 1-2 \\ 2-1 \\ 2-2 \\ 0-1 \end{array} $
342,805 342,703 342,410 340,745 340,462	2 2 3 3 6	0,21 0,21 0,21 0,00 0,00	36,37 36,38 36,41 36,38 36,41	$3p^4 \ ^3P - 4s'' \ ^3P^\circ$ $3p^4 \ ^3P - 4s'' \ ^3P^\circ$ $3p^4 \ ^3P - 4s'' \ ^3P^\circ$ $3p^4 \ ^3P - 4s'' \ ^3P^\circ$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 2 - 1 \\ 2 - 2 \end{array} $
283,765 274,552 273,546 273,065 271,820	2 3 1 2 3			$ 3p^4 ^3P - 5s ^3S^{\circ}$ $3p^4 ^3P - 5s ^3S^{\circ}$ $3p^4 ^3P - 5s ^3S^{\circ}$	- - - 1-1 1-1 2-1
263,819 263,716 170,227 166,246 166,163	2 2 1 1 0	_ _ _ _	_ _ _ _	- - - -	- - - -

K V, ground state $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3\ ^4S^0_{1^1/2}$ Ionization potential $666\ 000\ {\rm cm^{-1}};\ 82,6\ {\rm eV}$

				<u> </u>	
λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
1027,174	2		_	<u> </u>	_
1021,332	$ar{2}$			_	
917,498	1	_		_	
898,953	3	_	_	_	_
881,405	3	_	_	_	_
874,985	1	_	_	_	_
874,883	1		_	_	_
869,965	3			_	_
868,552	1		_		-
868,140	1	_	_	-	
867,921	1	_			-
771, 854	1		_	_	
854,416	2	_	_	_	_
839,439	1	_	_	_	-
830,785	1		_	-	_
826,395	1	_		-	, -
825,559	1	4,97	19,98	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$	$^{3}/_{2}$ — $^{3}/_{2}$
823,358	3	4,93	19,98	$3p^3 {}^{2}P^{\circ} - 3p^4 {}^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$
823,047	3	4,97	20,03	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$	3/2 - 5/2
821,568	1		_		_
810,893	1			_	
810,215	1		_		-
809,673	2		_	_	-
577, 806	2	_		-	-
373, 806	2	_	_	_	-
803,826	2			-	-
802,122	2		_	_	
•					205

	λ, Å	I	E _H , eV	E _B , eV	Transition	J
	786 ,464 784 ,713 771 ,456	2 2 3	_ _ _	_ _ _	_ _ _	_ _ _
	771,376 770,287 769,402 758,559 757,112	3 3 2 1 4	4,97 4,97 4,93 —	21,04 21,06 21,04 —	$3p^{3} {}^{2}P^{\circ}-1$ $3p^{3} {}^{2}P^{\circ}-2$ $3p^{3} {}^{2}P^{\circ}-1$ $-$	3/ ₂ —— 3/ ₂ —— 1/ ₂ ——
	750,381 750,230 743,292 731,858 724,420	1 3 2 2 8	0,00 0,00		$\frac{-}{-}$ $3p^3 {}^4S^{\circ} - 3p^4 {}^4P$ $3p^3 {}^4S^{\circ} - 3p^4 {}^4P$	$ 3/_2-5/_2$ $3/_2-3/_2$
	720,432 713,041 695,042 694,477 644,963	6 1 3 2 0	0,00 — — 4,93	17,21 — — 24,15	$3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}P$	$^{3/_{2}-^{1/_{2}}}$ $^{-}$ $^{-}$ $^{1/_{2}-^{3/_{2}}}$
	639,982 638,668 625,404 603,429 602,269	2 5 4 8 5	4,97 4,93 — 4,97 4,93	24,34 24,34 — 25,51 25,51	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ - \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
	586,322 585,510 580,319 544,627 544,537	8 5 7 1	3,00 2,98 2,98 — —	24,15 24,15 24,34 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} $
	536,216 535,287 534,873 515,320 509,601	2 1 2 1 1	 	 	 	
	483,745 482,706 468,447 462,596 459,005	4 4 2 1 3	0,00 0,00 — —	25,63 25,68 — — —	3p ³ ⁴ S°—3d ⁴ F 3p ³ ⁴ S°—3d ⁴ F ————————————————————————————————————	3/2—3/2 3/2—5/2 —————————————————————————————————
	456,328 455,670 452,900 452,227 449,708	4 1 3 2 4	4,97 4,93 4,97 4,93 0,00	32,14 32,14 32,34 32,34 27,57	$3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$	3/2 - 3/2 $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $3/2 - 5/2$
	449,013 447,085 445,878 438,647 438,023	3 3 1 2 5	0,00 — 4,93 4,97	27,61 — 33,23 33,23	$3p^{3} {}^{4}S^{\circ} - 3d {}^{4}D$ $ 3p^{3} {}^{2}P^{\circ} - 3$ $3p^{3} {}^{2}P^{\circ} - 3$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	425,588 425,159 422,178 421,446 419,731	7 5 5 3 1	3,00 2,98 2,98 - 3,00	32,14 32,14 32,34 	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ - 5/2 - 5/2 \end{array} $
	419,310 419,045 415,793 415,465 415,052	2 2 4 3 5	2,98 3,00 3,00 3,00 2,98	32,54 32,59 32,82 32,85 32,85	$3p^3 \ ^2D^{\circ} - 3d \ ^2F$ $3p^3 \ ^2D^{\circ} - 3d \ ^2F$ $3p^3 \ ^2D^{\circ} - 3d \ ^2D$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
ŧ۵	B					

λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
414,465 412,080 399,754 399,400 398,878	3 6 4 3 4	4,93 3,00 2,98 4,97	34,84 34,02 34,02 34,02 36,05	$3p ^{2}P^{\circ} - 3d' ^{2}D$ $ 2p^{3} ^{2}D^{\circ} - 4$ $2p^{3} ^{2}D^{\circ} - 4$ $3p^{3} ^{2}P^{\circ} - 3d' ^{2}P$	1/2—3/2 — 5/2— 3/2— 3/2—3/2
398,363 394,909 389,428 389,069 387,800	4 3 2 5 6	4,93 4,93 3,00 2,98 0,00	36,05 36,32 34,84 34,84 31,97	$3p^3 \ ^2P^{\circ} - 3d' \ ^2P$ $3p^3 \ ^2P^{\circ} - 3d' \ ^2S$ $3p^3 \ ^2D^{\circ} - 3d' \ ^2D$ $3p^3 \ ^2D^{\circ} - 3d' \ ^2D$ $3p^3 \ ^4S^{\circ} - 3d \ ^4P$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
386,710 385,689 385,020 384,516 384,400	4 5 1 2 2	0,00 0,00 - -	32,14 32,20 —	$3p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 4d {}^{4}P$ $-$	$\frac{-}{3/2-3/2}$ $\frac{3}{2-1/2}$ $-$
383,318 378,219 377,763 376,061 374,939	2 3 5 3 5	4,97 4,93 4,97 —	37,75 37,75 37,75 37,93	$-3p^3 {}^2P^{\circ} - 3d'' {}^2D$ $3p^3 {}^2P^{\circ} - 3d'' {}^2D$ $3p^3 {}^2P^{\circ} - 3d'' {}^2D$ $-$	$\begin{array}{c}$
373,318 373,074 372,462 372,148 370,580	3 2 4 10 3	0,00 3,00 2,98	33,23 36,29 36,29 —	$3p^3 {}^4S^{\circ} - 3$ $3p^3 {}^2D^{\circ} - 3d' {}^2F$ $3p^3 {}^2D^{\circ} - 3d' {}^2F$ $-$	3/2—— 5/2——5/2 3/2——5/2 —
370 ,523 354 ,927 354 ,627 352 ,750 352 ,463	3 6 0 2 2	3,00 2,98 3,00 2,98	37,93 37,93 38,15 38,15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
349,793 349,504 331,168 329,307 328,973	3 4 1 0 2	3,00 2,98 — 4,97 4,93	38,45 38,45 — 42,61 42,61	$3p^{3} {}^{2}D^{\circ} - 6$ $3p^{3} {}^{2}D^{\circ} - 6$ $ 3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
327,376 327,031 318,969 315,537 315,181	4 2 1 3 4	4,97 4,93 - 4,97 4,93	42,84 42,84 — 44,26 44,26	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$ $ 3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$	$ \begin{array}{c} 3/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ - \\ 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \end{array} $
312,770 311,243 300,503 300,252 297,064	5 6 6 7 5	2,98 3,00 3,00 2,98 0,00	42,61 42,84 44,26 44,26 41,73	$3p^{3} {}^{2}D^{\circ}$ — $4s {}^{2}P$ $3p^{3} {}^{2}D^{\circ}$ — $4s {}^{2}P$ $3p^{3} {}^{2}D^{\circ}$ — $4s' {}^{2}D$ $3p^{3} {}^{2}D^{\circ}$ — $4s' {}^{2}D$ $3p^{3} {}^{4}S^{\circ}$ — $4s {}^{4}P$	3/2 $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $3/2$ $3/2$ $3/2$ $3/2$
296,169 294,836 285,850 285,734 282,355	6 6 2 1 3	0,00 0,00 — —	41,86 42,05 — — —	$ 3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P $ $ 3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P $ $ - $ $ - $	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ - \\ - \\ - \end{array} $
277,394 264,478 264,339 246,235 232,673	3 2 2 1 1	_ _ _ _	 	_ _ _ _ _	_ _ _ _
214,351 213,121	2 1	_			_ _ _

K VI, ground state $1s^2 \ 2s^2 \ 2p^6 \ 3s^2 \ 3p^2 \ ^3P_0$ Ionization potential $804513 \ \text{cm}^{-1}; \ 99,741 \ \text{eV}$

λ, Ä	I	E_{H} , eV	E _B , eV	Transition	J
1000,056 982,115 968,518 938,287 930,318	2 2 6 2 1	— — — —	 	 	
929,374 918,581 882,184 872,006 776,957	1 2 2 1 4	 	 - -	- 	_ _ _ _
771 ,103 770 ,022 757 ,199 753 ,877 747 ,848	5 1 4 3 2	_ _ _ _	- - - -	 	_ _ _ _
739 ,177 725 ,309 724 ,420 716 ,272 715 ,999	1 2 8 2 5	0,36 0,36 0,14 0,14	17,46 17,48 17,45 17,46	$\begin{array}{c} - \\ 3p^2 \ ^3P - 3p^3 \ ^3D^\circ \end{array}$	
712,728 710,932 710,519 668,864 663,134	1 1 4 3 3	0,00 =	17,45 —	$3p^2 ^3P - 3p^3 ^3D^\circ$	0—1 —
661,402 659,852 657,931 657,327 651,324	3 3 3 1	_ _ _ _	 	 	- - - -
637,195 630,940 630,302 627,560 623,016	1 1 2 2 8			$\begin{array}{c} - \\ - \\ - \\ - \\ 3p^2 \ ^3P - 3p^3 \ ^3P^{\circ} \end{array}$	
616 ,136 612 ,272 611 ,862 519 ,372 501 ,649	6 1 3 5 2	0,14 0,00 2,35	20,26 20,26 27,07	$3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $ 3p^{2} {}^{3}P - 3p^{3} {}^{3}P^{\circ}$ $ 3p^{2} {}^{1}D - 3p^{3} {}^{3}S^{\circ}$	1—0, 1, — 0—1 — 2—1
491,062 490,423 488,120 481,313 480,397	2 2 10 2 1	2,35 =		$3p^{2} ^{1}D - 3p^{3} ^{1}P^{\circ}$	
473,207 464,270 461,737 460,438 458,048	2 10 3 8 7	0,36 0,14 0,00	27,07 	$3p^2 ^3P - 3p^3 ^3S^\circ \ -3p^2 ^3P - 3p^3 ^3S^\circ \ 3p^2 ^3P - 3p^3 ^3S^\circ \ $	
457,323 452,667 451,320 449,013 446,009	1 3 2 3 4	0,36 0,14	27,75 27,75 —	$\begin{array}{c} -1 & -1 & -1 & -1 & -1 & -1 & -1 & -1 $	· 2—1 —1 —1——

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
441,370 429,438 428,538 428,315 426,338	3 2 5 2 2	 		 	
420,807 418,160 416,509 412,790 406,102	4 2 1 1 2		- - - -	_ _ _ _	_ _ _ _
405,675 405,475 405,333 405,178 404,684	2 1 2 2 4	_ _ _ _	— — — —	- - - - -	
400,951 399,073 398,087 396,235 395,395	5 2 4 4 5	0,36 0,36 0,14 0,14 0,14	31 ,28 31 ,43 31 ,28 31 ,43 31 ,50	$3p^{2} ^{3}P - 3d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 3d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 3d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 3d ^{3}P^{\circ}$ $3p^{2} ^{3}P - 3d ^{3}P^{\circ}$	2—2 2—1 1—2 1—1 1—0
394,477 389,750 389,531 388,485 388,233	3 2 2 2 2 4	00,00 — — — —	31,42 — — — —	3p ² ³ P—3d ³ P° — — — — —	0—1 — — — —
386,505 377,263 372,774 370,115 368,030	$egin{array}{c} 2 \\ 2 \\ 4 \\ 2 \\ 2 \end{array}$	 	_ _ _ _	- - - -	_ _ _ _ _
367,378 365,614 357,685 357,645 356,615	2 3 3 3 3	_ _ _ _	_ _ _ _	_ _ _ _ _	
356,372 355,800 355,663 355,469 350,164	1 1 1 1 2	_ _ _ _	_ _ _ _	_ _ _ _	- - - -
338,161 335,175 303,023 302,657 293,438	3 3 4 2 2	_ _ _ _		- - - -	
293,332 293,050 289,241 259,609 258,873	3 2 4 2 3		- - 48,12 48,03	$3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$	
258,411 258,018 257,657 256,831 253,106	1 4 2 3 1	0,14 0,36 0,00 0,14	48,41 48,41 48,12 48,41	$3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ $3p^{2} ^{3}P - 4s ^{3}P^{\circ}$ -	1—1 2—2 0—1 1—2
252,965 247,777 205,862	1 1 2	_ _ _		_ _ _	 399

λ, Å	I	E _H , eV	E _B , eV	Transition	J
205,772 200,341	2 1	_	_		_ _
196,978 185,883 181,265 157,433	1 2 1	_ _ _	- -	- -	=

Unclassified Lines of Potassium

λ, Å	I	Presumed classification	λ, Å	I	Presumed classification
2240,89	4	-	1668,7	4	_
1895,7	2	_	1659,7	4	
1892,7	2	_	1033,875	2	
1890,9	2 2 2 2 2 4		1032,768	2	_
1887,9	2	_	774,738	3	_
1843,9	2	_	748,393	$\frac{1}{2}$	
1840,2	2		747,677	3	
1837,1	2	_	688,085	3	
1787,4	4	_	534,059	2	
1773,5	6	_	528,519	2	_
1770,8	6	_	520,493	3	
1765,4	3	_	446,926	2	
1752,4	4	_	368,580	2	
1749, 3	8	_	355,133	2	
1741,2	4	_	353,455	$\stackrel{-}{3}$	_
1739,4	2	_	353,325	3	_
1721,6	3	_	308,129	2	
1719,8	4 2 3 3 3	_	306,620	2	
1709,4	3	_	303,690	2	_
1704,5	9	_	267,036	2	_
17 03,5	9	_	266,938	2	_
1698,9	1 0	_	266,344	4	
1675,1	$\frac{2}{3}$	_	247,708	3	_
1672,9	3	_	247,561	2	_
1669,3	4	_	247,202	$\overline{2}$	

CALCIUM, Z = 20

Ca I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 {}^1S_0$ Ionization potential 49 304,80 cm⁻¹; 6,113 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J
22651,30	30	4,68	5,23	4d ³ D-4f ³ F°	3-2, 3,4
22625,51	20	4,68	5,23	4d ³ D-4f ³ F°	2-2, 3
22608,39	10	4,68	5,23	4d ³ D-4f ³ F°	1-2
19961,37	40	3,91	4,53	5s ³ S-5p ³ P°	1-0
19932,94	100	3,91	4,53	5s ³ S-5p ³ P°	1-1
19916,34	50	1,90	2,52	$4p\ ^3P^{\circ}$ — $3d\ ^3D$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-2 \\ 2-3 \\ 2-3 \end{array} $
19861,70	500	1,90	2,52	$4p\ ^3P^{\circ}$ — $3d\ ^3D$	
19852,96	250	3,91	4,53	$5s\ ^3S$ — $5p\ ^3P^{\circ}$	
19815,14	30	4,62	5,25	$4d\ ^1D$ — $4f\ ^1F^{\circ}$	
19776,67	2000	1,90	2,53	$4p\ ^3P^{\circ}$ — $3d\ ^3D$	
19505,62 19452,82 19309,43 19114,83 19045,86	500 1500 500 5 90	1,89 1,89 1,88 4,74 4,74	2,52 2,52 2,52 2,52 5,39 5,39	$4p \ ^3P^{\circ} - 3d \ ^3D$ $4p \ ^3P^{\circ} - 3d \ ^3D$ $4p \ ^3P^{\circ} - 3d \ ^3D$ $4p' \ ^3D^{\circ} - 3d^2 \ ^3F$ $4p' \ ^3D^{\circ} - 3d^2 \ ^3F$	1-1 1-2 0-1 3-2, 3 3-4
19021,39	4	4,74	5,39	$4p'\ ^3D^{\circ}$ — $3d^2\ ^3F$	2-2
18969,71	60	4,74	5,39	$4p'\ ^3D^{\circ}$ — $3d^2\ ^3F$	2-3
18924,96	30	4,73	5,39	$4p'\ ^3D^{\circ}$ — $3d^2\ ^3F$	1-2
16202,94	10	4,53	5,30	$5p\ ^3P^{\circ}$ — $5d\ ^3D$	2-1, 2
16195,33	150	4,53	5,30	$5p\ ^3P^{\circ}$ — $5d\ ^3D$	2-3
16156,04	100	4,55	5,32	$4p' ^{1}P^{\circ} - 5d ^{1}D$	1-2
16149,79	70	4,53	5,30	$5p ^{3}P^{\circ} - 5d ^{3}D$	1-1, 2
16135,80	20	4,53	5,30	$5p ^{3}P^{\circ} - 5d ^{3}D$	0-1
13167,75	24	4,45	5,39	$4p' ^{3}F^{\circ} - 3d^{2} ^{3}F$	4-3
13134,96	400	4,45	5,39	$4p' ^{3}F^{\circ} - 3d^{2} ^{3}F$	4-4
13086 ,26	50	4,44	5,39	$4p' ^{1}D^{\circ} - 3d^{2} ^{3}F$ $4p' ^{1}D^{\circ} - 3d^{2} ^{3}F$ $4p' ^{3}F^{\circ} - 3d^{2} ^{3}F$ $4p' ^{3}F^{\circ} - 3d^{2} ^{3}F$ $4p' ^{3}F^{\circ} - 3d^{2} ^{3}F$	2—2
13061 ,84	8	4,44	5,39		2—3
13057 ,82	20	4,44	5,39		3—2
13033 ,41	300	4,44	5,39		3—3
13001 ,37	20	4,44	5,39		3—4
12909,07	200	4,43	5,39	$4p'\ ^3F^{\circ} - 3d^2\ ^3F$	$\begin{array}{c} 2-2 \\ 2-3 \\ 1-0 \\ 1-1 \\ 1-2 \end{array}$
12885,21	15	4,43	5,39	$4p'\ ^3F^{\circ} - 3d^2\ ^3F$	
12826,60	25	3,91	4,88	$5s\ ^3S - 4p'\ ^3P^{\circ}$	
12823,46	100	3,91	4,88	$5s\ ^3S - 4p'\ ^3P^{\circ}$	
12815,69	400	3,91	4,88	$5s\ ^3S - 4p'\ ^3P^{\circ}$	
10879,78	4	4,88	6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$	1-0
10869,37	3	4,88	6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$	2-1
10863,72	2	4,88	6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$	1-1
10861,51	3	4,88	6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$	0-1
10838,77	10	4,88	6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$	2-2
10833,12 10343,85 9701,81 9688,60 9676,25	$egin{array}{c} 4 \\ 500 \\ 20 \\ 15 \\ 5 \end{array}$	4,88 2,93 4,74 4,74 4,73	6,02 4,13 6,02 6,02 6,02	$4p' \ ^{3}P^{\circ} - 3d^{2} \ ^{3}P$ $4p \ ^{1}P^{\circ} - 5s \ ^{1}S$ $4p' \ ^{3}D^{\circ} - 3d^{2} \ ^{3}P$ $4p' \ ^{3}D^{\circ} - 3d^{2} \ ^{3}P$ $4p' \ ^{3}D^{\circ} - 3d^{2} \ ^{3}P$	$ \begin{array}{r} 1-2 \\ 1-0 \\ 3-2 \\ 2-1 \\ 1-0 \end{array} $
9664,29 9663,58 7468,41 7326,146 7202,194	$\begin{array}{c} 3 \\ 2 \\ 3 \\ 400 \\ 200 \end{array}$	4,74 4,73 — 2,93 2,71	6,02 6,02 - 4,62 4,43	$4p' \ ^{3}D^{\circ} - 3d^{2} \ ^{3}P$ $4p' \ ^{3}D^{\circ} - 3d^{2} \ ^{3}P$ $ 4p \ ^{1}P^{\circ} - 4d \ ^{1}D$ $3d \ ^{1}D - 4p' \ ^{3}F^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ -1 \\ 1-2 \\ 2-2 \end{array} $
7202,194 7148,147 6798,51	500 6	2,71 $2,71$ $2,71$	4,44 4,53	$3d ^{1}D - 4p' ^{1}D^{\circ}$ $3d ^{1}D - 5p ^{3}P^{\circ}$	2—2 2— 1

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I	E _H , eV	E _B , eV	Transition	J
500 1 50	2,71 2,93 0,00	4,55 4,78 1,89	3d ¹ D-4p' ¹ P° 4p ¹ P°-4p ² ³ P 4s ² ¹ S-4p ³ P°	2—1 1—2 0—1
1 30 80 40 1	2,53 2,52 2,52 2,53 2,53	4,43 4,43 4,43 4,44 4,44	3d 3D-4p' 3F° 3d 3D-4p' 3F° 3d 3D-4p' 3F° 3d 3D-4p' 3F° 3d 3D-4p' 1D°	3-2 2-2 1-2 3-3 3-2
125 10 50 150 3	2,52 2,52 2,52 2,53 —	4,44 4,44 4,44 4,45	3d 3D-4p' 3F° 3d 3D-4p' 1D° 3d 3D-4p' 1D° 3d 3D-4p' 3F°	2-3 2-2 1-2 3-4
3 5 4 3 40	4,45 4,44 4,43 2,53	6,40 6,39 6,39 4,53	4p' 3F°—4d' 3G 4p' 3F°—4d' 3G 4p' 3F°—4d' 3G 3d 3D—5p 3P°	 4-5 3-4 2-3 3-2
25 15 10 150 10	2,52 2,52 2,52 1,90 2,52	4,53 4,53 4,53 3,91 4,53	$3d\ ^3D-5p\ ^3P^\circ \ 3d\ ^3D-5p\ ^3P^\circ \ 3d\ ^3D-5p\ ^3P^\circ \ 4p\ ^3P\ -5s\ ^3S \ 3d\ ^3D-5p\ ^3P^\circ \ $	$\begin{array}{c} 2-1 \\ 1-0 \\ 1-1 \\ 2-1 \\ 2-2 \end{array}$
1 100 80 1 100	2,52 1,89 1,88 2,93 2,93	4,53 3,91 3,91 5,04 5,05	$3d \ ^{3}D - 5\rho \ ^{3}P^{\circ}$ $4\rho \ ^{3}P^{\circ} - 5s \ ^{3}S$ $4\rho \ ^{3}P^{\circ} - 5s \ ^{3}S$ $4\rho \ ^{1}P^{\circ} - 4\rho^{2} \ ^{1}S$ $4\rho \ ^{1}P^{\circ} - 4\rho^{2} \ ^{1}D$	1-2 1-1 0-1 1-0 1-2
3 1 4 2 3	4,45 4,45 4,44	6,60 6,60 6,60	4p' 3F°—4d' 3F 4p' 3F°—4d' 3F 4p' 3F°—4d' 3F	
3 1 4 1 4	4,44 4,44 4,43 4,43	6,60 6,60 6,60 6,60	$4p'\ ^3F^{\circ}-4d'\ ^3F$ $4p'\ ^3F^{\circ}-4d'\ ^3F$ $4p'\ ^3F^{\circ}-4d'\ ^3F$ $4p'\ ^3F^{\circ}-4d'\ ^3F$ $-$	3-3 3-4 2-2 2-3
3 25 30 50 60	2,52 2,53 2,52 2,52 2,52	- 4,73 4,74 4,73 4,74		$\begin{array}{c} - \\ 2-1 \\ 3-2 \\ 1-1 \\ 2-2 \end{array}$
20 80 25 20 25	2,52 2,53 2,52 2,93 2,71	4,74 4,74 4,74 5,18 5,03	3d ³ D-4p' ³ D° 3d ³ D-4p' ³ D° 3d ³ D-4p' ³ D° 4p ¹ P°-6s ¹ S 3d ¹ D-4p' ¹ F°	$ \begin{array}{r} 1-2 \\ 3-3 \\ 2-3 \\ 1-0 \\ 2-3 \end{array} $
60 40 20 25 20	2,53 2,52 2,52 2,52 2,52 2,52	4,88 4,88 4,88 4,88 4,88	3d 3D—4p' 3p° 3d 3D—4p' 3p° 3d 3D—4p' 3p° 3d 3D—4p' 3p° 3d 3D—4p' 3p°	3-2 2-1 2-2 1-0 1-1
2 50 40 50 2	2,52 2,93 2,71 2,71 2,93	4,88 5,32 5,17 5,25 5,49	$3d\ ^{3}D-4p'\ ^{3}P^{\circ}$ $4p\ ^{1}P^{\circ}-5d\ ^{1}D$ $3d\ ^{1}D-5p\ ^{1}P^{\circ}$ $3d\ ^{1}D-4f\ ^{1}F^{\circ}$ $4p\ ^{1}P^{\circ}-7s\ ^{1}S$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-1 \\ 2-3 \\ 1-0 \end{array} $
	1 50	500	500	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
4685,265	12	2,93	5,58	4p ¹ P°-6d ¹ D	$ \begin{array}{r} 1-2 \\ 3-3 \\ 3-4 \\ 2-3 \\ 1-2 \end{array} $
4585,923	2	2,53	5,23	3d ³ D-4f ³ F°	
4585,871	50	2,53	5,23	3d ³ D-4f ³ F°	
4581,402	40	2,52	5,23	3d ³ D-4f ³ F°	
4578,558	30	2,52	5,23	3d ³ D-4f ³ F°	
4526,935 4512,282 4509,446 4507,854 4507,417	30 5 3 1	2,71 2,53 2,52 2,52 2,52 2,52	5,45 5,27 5,27 5,27 5,27	$3d ^{1}D - 6p ^{1}P^{\circ}$ $3d ^{3}D - 6p ^{3}P^{\circ}$ $3d ^{3}D - 6p ^{3}P^{\circ}$ $3d ^{3}D - 6p ^{3}P^{\circ}$ $3d ^{3}D - 6p ^{3}P^{\circ}$	$\begin{array}{c} 2-1 \\ 3-2 \\ 2-1 \\ 2-2 \\ 1-0 \end{array}$
4506,624	1	2,52	5,27	3d 3D-6p 3P°	1-1
4505,00	0	2,52	5,27	3d 3D-6p 3P°	1-2
4456,612	10	1,90	4,68	4p 3P°-4d 3D	2-1
4455,887	40	1,90	4,68	4p 3P°-4d 3D	2-2
4454,781	80	1,90	4,68	4p 3P°-4d 3D	2-3
4435,688	40	1,89	4,68	$4p ^3P^{\circ} - 4d ^3D$ $4p ^3P^{\circ} - 4d ^3D$ $4p ^3P^{\circ} - 4d ^3D$ $3d ^1D - 5f ^1F^{\circ}$ $4p ^3P^{\circ} - 4p^2 ^3P$	1—1
4434,960	60	1,89	4,68		1—2
4425,441	50	1,88	4,68		0—1
4355,096	25	2,71	5,55		2—3
4318,652	45	1,90	4,77		2—1
4307,741	45	1,89	4,76	$4p \ ^{3}P^{\circ} - 4p^{2} \ ^{3}P$	1-0
4302,527	60	1,90	4,78		2-2
4298,986	30	1,89	4,77		1-1
4289,364	40	1,88	4,77		0-1
4283,010	40	1,89	4,78		1-2
4240,456	6	2,71	5,63	$3d ^{1}D - 7p ^{1}P^{\circ}$ $4s^{2} ^{1}S - 4p ^{1}P^{\circ}$ $3d ^{1}D - 6f ^{1}F^{\circ}$ $3d ^{3}D - 5f ^{3}F^{\circ}$ $3d ^{3}D - 5f ^{3}F^{\circ}$	2-1
4226,728	500	0,00	2,93		0-1
4108,554	10	2,71	5,73		2-3
4098,533	15	2,53	5,55		3-4
4094,930	12	2,52	5,55		2-3
4092,633 4058,912 3973,707 3972,570 3957,053	8 1 12 1 10	2,52 2,71 1,90 2,71 1,89	5,55 5,76 5,02 5,83 5,02	$3d\ ^3D - 5f\ ^3F^\circ \ 3d\ ^1D - 8p\ ^1P^\circ \ 4p\ ^3P^\circ - 6s\ ^3S \ 3d\ ^1D - 7f\ ^1F^\circ \ 4p\ ^3P^\circ - 6s\ ^3S$	1-2 $2-1$ $2-1$ $2-3$ $1-1$
3948,901 3923,50 3889,141 3875,807 3872,552	$\begin{array}{c} 6 \\ 0 \\ 1 \\ 4 \\ 3 \end{array}$	1,88 1,89 2,71 2,53 2,52	5,02 5,04 5,90 5,72 5,72	$4p\ ^3P^{\circ}-6s\ ^3S$ $4p\ ^3P^{\circ}-4p^{2}\ ^1S$ $3d\ ^1D-8f\ ^1F^{\circ}$ $3d\ ^3D-6f\ ^3F^{\circ}$ $3d\ ^3D-6f\ ^3F^{\circ}$	0-1 $1-0$ $2-3$ $3-2$, 3, 4 $2-2$, 3
3870,508 3761,72 3753,367 3750,349 3748,374	2 0 1 1 1	2,52 1,89 2,53 2,52 2,52	5,72 5,18 5,83 5,83 5,83	$3d\ ^3D-6f\ ^3F^\circ \ 4p\ ^3P^\circ-6s\ ^1S \ 3d\ ^3D-7f\ ^3F^\circ \ 3d\ ^3D-7f\ ^3F^\circ \ 3d\ ^3D-7f\ ^3F^\circ \ $	$ \begin{array}{c} 1-2 \\ 1-0 \\ 3-2, 3, 4 \\ 2-2, 3 \\ 1-2 \end{array} $
3678,240	3	2,53	5,90	3d ³ D-8f ³ F°	3-2, 3, 4
3675,307	2	2,53	5,90	3d ³ D-8f ³ F°	2-2, 3
3673,448	1	2,52	5,90	3d ³ D-8f ³ F°	1-2
3644,990	2	1,90	5,30	4p ³ P°-5d ³ D	2-1
3644,765	15	1,90	5,30	4p ³ P°-5d ³ D	2-2
3644,410 3630,974 3630,748 3624,111 3487,598	40 15 30 20 12	1,90 1,89 1,89 1,88 1,90	5,30 5,30 5,30 5,30 5,45	4p 3P°—5d 3D 4p 3P°—5d 3D 4p 3P°—5d 3D 4p 3P°—5d 3D 4p 3P°—5d 3D 4p 3P°—7s 3S	2—3 1—1 1—2 0—1 2—1
3474,763	8	1,89	5,45	$4p {}^{3}P^{\circ} - 7s {}^{3}S$	1—1
3468,476	4	1,88	5,45	$4p {}^{3}P^{\circ} - 7s {}^{3}S$	0—1
3362,28	0	1,90	5,59	$4p {}^{3}P^{\circ} - 6d {}^{3}D$	2—1

λ, Å	I	$E_{\rm H}$, eV	E _B . eV	Transition	J
3362,131	35	1,90	5,59	4p ³ P°—6d ³ D	$\begin{array}{c} 2-2 \\ 2-3 \end{array}$
3361,918	35	1,90	5,59	4p ³ P°—6d ³ D	
3350,361	25	1,89	5,59	4p 3P°—6d 3D	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 0 - 1 \\ 2 - 1 \\ 1 - 1 \end{array} $
3350,209	25	1,89	5,59	4p 3P°—6d 3D	
3344,513	8	1,88	5,59	4p 3P°—6d 3D	
3286,067	4	1,90	5,67	4p 3P°—8s 3S	
3274,661	2	1,89	5,67	4p 3P°—8s 3S	
3269,090 3226,129 3225,896 3215,334 3215,145	1 8 8 5 5	1,88 1,90 1,90 1,89 1,89	5,67 5,74 5,74 5,74 5,74	4p 3P°—8s 3S 4p 3P°—7d 3D 4p 3P°—7d 3D 4p 3P°—7d 3D 4p 3P°—7d 3D 4p 3P°—7d 3D	0-1 $2-2$ $2-3$ $1-1$ $1-2$
3209,930	2	1,88	5,74	4p 3P°-7d 3D	0-1 $2-1$ $1-1$ $0-1$ $2-2$
3180,521	1	1,90	5,80	4p 3P°-9s 3S	
3169,854	1	1,89	5,80	4p 3P°-9s 3S	
3164,618	1	1,88	5,80	4p 3P°-9s 3S	
3151,280	4	1,90	5,83	4p 3P°-8d 3D	
3150,738 3141,164 3140,782 3136,003 3117,656	4 3 3 1 1	1,90 1,89 1,89 1,88 1,90	5,83 5,83 5,83 5,83 5,87	4p 3P°—8d 3D 4p 3P°—8d 3D 4p 3P°—8d 3D 4p 3P°—8d 3D 4p 3P°—8d 3D 4p 3P°—10s 3S	2—3 1—1 1—2 0—1 2—1
3108,58 3107,388 3102,36 3080,826 3009,205	3 1 0 2 5	1,89 1,88 1,90	5,87 5,87 6,02	$\begin{array}{c} - \\ 4p \ ^3P^{\circ} - 10s \ ^3S \\ 4p \ ^3P^{\circ} - 10s \ ^3S \\ - \\ 4p \ ^3P^{\circ} - 3d^2 \ ^3P \end{array}$	1—1 0—1 — 2—1
3006,858	6	1,90	6,02	$4p\ ^{3}P^{\circ}-3d^{2}\ ^{3}P$	2-2
3000,863	5	1,89	6,02		1-0
2999,641	4	1,89	6,02		1-1
2997,309	5	1,89	6,02		1-2
2994,958	5	1,88	6,02		0-1
2772,80	1	1,90	6,37	$4p\ ^3P^{\circ}-4d'\ ^3D$	2-2
2770,79	3	1,90	6,37		2-3
2766,13	1	1,89	6,37		1-1
2764,60	2	1,89	6,37		1-2
2762,05	2	1,88	6,37		0-1
2757,40	2	1,90	6,39	$4p ^3P^{\circ}-4d' ^3S$	2-1
2749,34	1	1,89	6,39	$4p ^3P^{\circ}-4d' ^3S$	1-1
2745,49	1	1,88	6,39	$4p ^3P^{\circ}-4d' ^3S$	0-1
2734,82	2	0,00	4,53	$4s^2 ^1S-5p ^3P^{\circ}$	0-1
2721,645	10	0,00	4,55	$4s^2 ^1S-4p' ^1P^{\circ}$	0-1
2617,66	3	0,00	4,73	4s ² 1S—4p' 3D°	0-1 $2-1$ $2-2$ $1-0$ $1-1$
2565,20	2	1,90	6,73	4p 3P°—4d' 3P	
2564,09	3	1,90	6,73	4p 3P°—4d' 3P	
2558,60	2	1,89	6,73	4p 3P°—4d' 3P	
2558,20	2	1,89	6,73	4p 3P°—4d' 3P	
2557 ,18	2	1,89	6,73	$4p \ ^{3}P^{\circ}-4d' \ ^{3}P$ $4p \ ^{3}P^{\circ}-4d' \ ^{3}P$ $4s^{2} \ ^{1}S-4p' \ ^{3}P^{\circ}$ $4s^{2} \ ^{1}S-5p \ ^{1}P^{\circ}$ $4s^{2} \ ^{1}S-6p \ ^{1}P^{\circ}$	1-2
2554 ,82	2	1,88	6,73		0-1
2541 ,40	0	0,00	4,88		0-1
2398 ,559	2	0,00	5,17		0-1
2275 ,471	1	0,00	5,45		0-1
2200 ,728 2150 ,78 404	1	00,00 00,00	5,63 5,76	$4s^{2} {}^{1}S$ $-7p {}^{1}P^{\circ}$ $4s^{2} {}^{1}S$ $-8p {}^{1}P^{\circ}$	0—1 0—1

Ca II, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 S_{1/2}$ Ionization potential 95 748,0 cm⁻¹; 11,870 eV

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λ, Å	I	E _{II} , eV	$E_{ m B},~{ m eV}$	Transition	J
11949,72 11838,99 9931,39 9890,63 9854,74	1 2 9 11 8	6,47 6,47 7,51 8,44 7,50	7,50 7,51 8,76 9,69 8,76	$5s {}^{2}S - 5p {}^{2}P^{\circ}$ $5s {}^{2}S - 5p {}^{2}P^{\circ}$ $5p {}^{2}P^{\circ} - 6s {}^{2}S$ $4f {}^{2}F^{\circ} - 5g {}^{2}G$ $5p {}^{2}P^{\circ} - 6s {}^{2}S$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2, 7/2 - 7/2, 9/2 \\ 1/2 - 1/2 \end{array} $
8927,36 8912,07 8662,140 8542,089 8498,018	11 10 16 17 13	7,05 7,05 1,69 1,70 1,69	8,44 8,44 3,12 3,15 3,15	$\begin{array}{c} 4d\ ^2D-4f\ ^2F^{\circ} \ 4d\ ^2D-4f\ ^2F^{\circ} \ 3d\ ^2D-4p\ ^2P^{\circ} \ 3d\ ^2D-4p\ ^2P^{\circ} \ 3d\ ^2D-4p\ ^2P^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
8254,725 8248,797 8201,720 8020,504 8017,502	$7 \\ 11 \\ 10 \\ 2 \\ 2$	7,51 7,51 7,50 8,44 8,44	9,02 9,02 9,02 9,98 9,98	$5p ^{2}P^{\circ} - 5d ^{2}D$ $5p ^{2}P^{\circ} - 5d ^{2}D$ $5p ^{2}P^{\circ} - 5d ^{2}D$ $4f ^{2}F^{\circ} - 6d ^{2}D$ $4f ^{2}F^{\circ} - 6d ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
6456,874 5923,69 5922,72 5339,189 5307,223	8 1 1 5 7	8,44 8,44 8,44 8,44 7,51	10,36 10,53 10,53 10,76 9,85	$4f {}^{2}F^{\circ}-6g {}^{2}G$ $4f {}^{2}F^{\circ}-7d {}^{2}D$ $4f {}^{2}F^{\circ}-7d {}^{2}D$ $4f {}^{2}F^{\circ}-7g {}^{2}G$ $5p {}^{2}P^{\circ}-7s {}^{2}S$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
5285,268 5021,138 5019,971 5001,479 4799,973	6 4 8 7 4	7,50 7,51 7,51 7,50 8,44	9,85 9,98 9,98 9,98 11,02	$5p ^{2}P^{\circ} - 7s ^{2}S$ $5p ^{2}P^{\circ} - 6d ^{2}D$ $5p ^{2}P^{\circ} - 6d ^{2}D$ $5p ^{2}P^{\circ} - 6d ^{2}D$ $4f ^{2}F^{\circ} - 8g ^{2}G$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2}, 7/_{2} - 7/_{2}, 9/_{2} \end{array} $
4721,028 4716,736 4489,178 4479,226 4472,043	4 3 2 1 2	7,05 7,05 8,44 6,47 6,47	9,67 9,67 11,20 9,23 9,24	$4d\ ^{2}D-5f\ ^{2}F^{\circ}\ 4d\ ^{2}D-5f\ ^{2}F^{\circ}\ 4f\ ^{2}F^{\circ}-9g\ ^{2}G\ 5s\ ^{2}S-6p\ ^{2}P^{\circ}\ 5s\ ^{2}S-6p\ ^{2}P^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2, & 7/2 - 7/2, & 9/2 \\ & 1/2 - 1/2 \\ & 1/2 - 3/2 \end{array}$
4220,074 4206,175 4110,279 4109,816 4097,102	5 4 3 6 5	7,51 7,50 7,51 7,51 7,50	10,45 10,45 10,53 10,53 10,53	$5p ^{2}P^{\circ}$ —8s ^{2}S $5p ^{2}P^{\circ}$ —8s ^{2}S $5p ^{2}P^{\circ}$ —7d ^{2}D $5p ^{2}P^{\circ}$ —7d ^{2}D $5p ^{2}P^{\circ}$ —7d ^{2}D	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3968,468 3933,663 3758,386 3755,668 3739,375	22 23 3 2 1	0,00 0,00 7,05 7,05 7,50	3,12 3,15 10,35 10,35 10,82	$4s^2S-4p^2P^\circ \ 4s^2S-4p^2P^\circ \ 4d^2D-6f^2F^\circ \ 4d^2D-6f^2F^\circ \ 5p^2P^\circ-9s^2S$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
3736,901 3706,026 3694,355 3694,108 3683,696	18 17 1 4 3	3,15 3,12 7,51 7,51 7,50	6,47 6,47 10,87 10,87 10,87	$4p \ ^{2}P^{\circ}-5s \ ^{2}S$ $4p \ ^{2}P^{\circ}-5s \ ^{2}S$ $5p \ ^{2}P^{\circ}-8d \ ^{2}D$ $5p \ ^{2}P^{\circ}-8d \ ^{2}D$ $5p \ ^{2}P^{\circ}-8d \ ^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3495,156 3461,871 3452,657 3347,035 3181,275	1 2 1 1 15	7,51 7,51 7,50 7,05 3,15	11,06 11,09 11,09 10,75 7,05	$5p ^{2}P^{\circ}$ — $10s ^{2}S$ $5p ^{2}P^{\circ}$ — $9d ^{2}D$ $5p ^{2}P^{\circ}$ — $9d ^{2}D$ $4d ^{2}D$ — $7f ^{2}F^{\circ}$ $4p ^{2}P^{\circ}$ — $4d ^{2}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
3179,332 3158,869 2573,09 2208,611 2197,787	18 17 3 3 2	3,15 3,12 - 3,15 3,12	7,05 7,05 — 8,76 8,76	$4p \ ^{2}P^{\circ}-4d \ ^{2}D \ 4p \ ^{2}P^{\circ}-4d \ ^{2}D \ -4p \ ^{2}P^{\circ}-6s \ ^{2}S \ 4p \ ^{2}P^{\circ}-6s \ ^{2}S$	$ \begin{array}{c} 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ - \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array} $
					405

λ, Å	I	E _{II} . eV	E _B , eV	Transition	J
2132,304 2131,505 2128,750 2113,146 2112,757	1 2 0 1 2	1,69 1,70 1,69 3,15 3,15	7,50 7,51 7,51 9,02 9,02	$\begin{array}{c} 3d\ ^{2}D-5p\ ^{2}P^{\circ} \\ 3d\ ^{2}D-5p\ ^{2}P^{\circ} \\ 3d\ ^{2}D-5p\ ^{2}P^{\circ} \\ 4p\ ^{2}P^{\circ}-5d\ ^{2}D \\ 4p\ ^{2}P^{\circ}-5d\ ^{2}D \end{array}$	3/2 - 1/2 $5/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
2103,235 1850,691 1843,088 1840,061 1838,008	2 2 1 8 7	3,12 3,15 3,12 1,70 1,69	9,02 9,85 9,85 8,44 8,44	$4p\ ^{2}P^{\circ}-5d\ ^{2}D$ $4p\ ^{2}P^{\circ}-7s\ ^{2}S$ $4p\ ^{2}P^{\circ}-7s\ ^{2}S$ $3d\ ^{2}D-4f\ ^{2}F^{\circ}$ $3d\ ^{2}D-4f\ ^{2}F^{\circ}$	$\begin{array}{c} {}^{1}/_{2} - {}^{3}/_{2} \\ {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{5}/_{2} - {}^{5}/_{2}, \\ {}^{3}/_{2} - {}^{5}/_{2} \end{array}$
1814,647 1814,495 1807,337 1698,183 1691,779	1 1 1 1	3,15 3,15 3,12 3,15 3,15	9,98 9,98 9,98 10,45 10,45	$4p ^{2}P^{\circ} - 6d ^{2}D$ $4p ^{2}P^{\circ} - 6d ^{2}D$ $4p ^{2}P^{\circ} - 6d ^{2}D$ $4p ^{2}P^{\circ} - 8s ^{2}S$ $4p ^{2}P^{\circ} - 8s ^{2}S$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$
1680,129 1680,051 1673,860 1651,991 1649,858	$\frac{1}{1}$ 1 2	3,15 3,15 3,12 0,00 0,00	10,53 10,53 10,53 7,50 7,51	$4p ^{2}P^{\circ}$ — $7d ^{2}D$ $4p ^{2}P^{\circ}$ — $7d ^{2}D$ $4p ^{2}P^{\circ}$ — $7d ^{2}D$ $4s ^{2}S$ — $5p ^{2}P^{\circ}$ $4s ^{2}S$ — $5p ^{2}P^{\circ}$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 3/2$
1644,441 1643,770 1642,802 1554,642 1553,176	0 4 4	1,70 1,69 1,69 1,70 1,69	9,24 9,23 9,24 9,67 9,67	3d ² D-6p ² P° 3d ² D-6p ² P° 3d ² D-6p ² P° 3d ² D-5f ² F° 3d ² D-5f ² F°	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2, & 7/2 \\ 3/2 - 5/2 \end{array}$
1433,749 1432,503 1370,6 1369,1 1342,535	1 3 3	1,70 1,69 — 0,00	10,35 10,35 — — 9,23	$\begin{array}{c} 3d\ ^{2}D-6f\ ^{2}F^{\circ}\\ 3d\ ^{2}D-6f\ ^{2}F^{\circ}\\ -\\ -\\ 4s\ ^{2}S-6p\ ^{2}P^{\circ} \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1341,889	1	0.00	9,24	4s ² S—6p ² P°	$^{1}/_{2}$ — $^{3}/_{2}$

Ca III, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^{6 \, 1} S_0$ Ionization potential 413 127 cm $^{-1}$; 51,218 eV

λ. Å	I	E _H . eV	EB, eV	Transition	J
4081,74	5	30,71	33,75	$4s' \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1/2 \end{bmatrix}$	1-1
3761,62	6	30,45	33,75	$4s' \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1/2 \end{bmatrix}$	0-1
3537,75	7	30,24	33,75	$4s \begin{bmatrix} 11/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1/2 \end{bmatrix}$	1-1
3372,68	8	30,07	33,75	$4s \begin{bmatrix} 11/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 1/2 \end{bmatrix}$	2-1
3367,81	5	30,71	34,39	$4s' \begin{bmatrix} 1/2 \end{bmatrix}^{\circ} - 4p \begin{bmatrix} 21/2 \end{bmatrix}$	1-2
3233,02	4	30,71	34,54	$4s' \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-4p \begin{bmatrix} 11/2 \end{bmatrix}$	1-1
3119,66	8	30,71	34,68	$4s' \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-4p \begin{bmatrix} 11/2 \end{bmatrix}$	1-2
3028,66	6	30,45	34,54	$4s' \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-4p \begin{bmatrix} 11/2 \end{bmatrix}$	0-1
2989,30	6	30,71	34,86	$4s' \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-4p' \begin{bmatrix} 11/2 \end{bmatrix}$	1-1
2988,61	7	30,24	34,39	$4s \begin{bmatrix} 1/2 \end{bmatrix}$ ° $-4p' \begin{bmatrix} 21/2 \end{bmatrix}$	1-2
2924,33	8	30,71	34,95	$4s' [1/2]^{\circ} - 4p' [11/2]$	1-2
2907,90	2	30,71	34,97	$4s' [1/2]^{\circ} - 4p [1/2]$	1-0
2899,78	9	30,07	34,34	$4s [11/2]^{\circ} - 4p [21/2]$	2-3
2881,80	7	30,24	34,54	$4s [11/2]^{\circ} - 4p [11/2]$	1-1
2869,95	7	30,07	34,39	$4s [11/2]^{\circ} - 4p [21/2]$	2-2
2866,57 2813,88 406	7 7	30,71 30,45	35,03 34,85	$4s' [1/2]^{\circ} - 4p' [1/2]$ $4s' [1/2]^{\circ} - 4p' [11/2]$	1—1 0—1

λ, Å	I	E _H , eV	E _B , eV	Transition	
2791 ,63 2771 ,27 2704 ,87	6 4 6	30,24 30,07 30,45	34,68 34,54 35,03	$4s [1^{1}/_{2}]^{\circ}$ — $4p [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}$ — $4p [1^{1}/_{2}]$ $4s' [1/_{2}]^{\circ}$ — $4p' [1/_{2}]$	1-2 2-1 0-1
2687,78 2686,73 2634,17 2620,82 2590,34	8 3 6 6 2	30,07 30,24 30,24 30,24 30,07	34,68 34,85 34,95 34,97 34,85	$4s [1^{1}/_{2}]^{\circ}-4p [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$	2—2 1—1 1—2 1—0 2—1
2587,09 2541,49 2497,67 2472,52 2442,54	3 6 5 1 1	30,24 30,07 30,07 35,03 34,97	35,03 34,95 35,03 40,04 40,04	$4s [1^{1}/_{2}]^{\circ}-4p' [1/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $4s [1^{1}/_{2}]^{\circ}-4p' [1/_{2}]$ $4p' [1/_{2}]-4d [1/_{2}]^{\circ}$ $4p [1/_{2}]-4d [1/_{2}]^{\circ}$	1—1 2—2 2—1 1—1 0—1
2431,08 2393,20 2351,40 2310,87 2276,54	1 3 1 0 2	34,95 34,95 34,85 34,68 34,68	40,04 40,13 40,13 40,04 40,13	$4p' [1^{1}/_{2}]-4d [^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}]-4d [1^{1}/_{2}]^{\circ}$ $4p' [1^{1}/_{2}]-4d [1^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}]-4d [^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}]-4d [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-2 \\ 2-1 \\ 2-2 \end{array} $
2256,33 2252,65 2244,31 2219,87 2219,22	0 2 2 1 2	34,95 34,54 28,87 34,54 34,85	40,44 40,04 34,39 40,13 40,44	$\begin{array}{c} 4p' \; [1^{1}/_{2}] - 4d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 4d \; [^{1}/_{2}]^{\circ} \\ 3d' \; [1^{1}/_{2}]^{\circ} - 4p \; [2^{1}/_{2}] \\ 4p \; [1^{1}/_{2}] - 4d \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 4d \; [3^{1}/_{2}]^{\circ} \end{array}$	2-3 1-1 1-2 1-2 1-3
2204,40 2191,27 2183,30 2171,60 2163,51	3 2 3 5 4	35,03 34,39 28,87 34,95 34,95	40,65 40,04 34,54 40,65 40,68	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 5s \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{21}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 3d' \ [^{11}/_{2}]^{\circ} - 4p \ [^{11}/_{2}] \\ 4p' \ [^{11}/_{2}] - 5s \ [^{11}/_{2}]^{\circ} \\ 4p' \ [^{11}/_{2}] - 4d \ [^{21}/_{2}]^{\circ} \end{array}$	1-2 $2-1$ $1-1$ $2-2$ $2-2$
2160,40 2152,47 2143,81 2140,39 2131,49	2 6 1 6 3	34,39 34,68 34,34 34,95 28,87	40 ,13 40 ,44 40 ,13 40 ,74 34 ,68	$\begin{array}{c} 4p \; [2^{1}/_{2}] - 4d \; [1^{1}/_{2}]^{\circ} \\ 4p \; [1^{1}/_{2}] - 4d \; [3^{1}/_{2}]^{\circ} \\ 4p \; [2^{1}/_{2}] - 4d \; [1^{1}/_{2}]^{\circ} \\ 4p' \; [1^{1}/_{2}] - 5s \; [1^{1}/_{2}]^{\circ} \\ 3d' \; [1^{1}/_{2}]^{\circ} - 4p \; [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 3-2 \\ 2-1 \\ 1-2 \end{array} $
2129,20 2098,56 2074,89 2069,55 2067,64	6 5 2 2 2	34,85 27,84 34,68 28,87 34,68	40,68 33,74 40,65 34,85 40,68	$4p' [1^{1}/_{2}]-4d [2^{1}/_{2}]^{\circ}$ $3d [1^{1}/_{2}]^{\circ}-4p [^{1}/_{2}]$ $4p [1^{1}/_{2}]-5s [1^{1}/_{2}]^{\circ}$ $3d' [1^{1}/_{2}]^{\circ}-4p' [1^{1}/_{2}]$ $4p [1^{1}/_{2}]-4d [2^{1}/_{2}]^{\circ}$	1-2 1-1 2-2 1-1 2-2
2062 ,17 2056 ,64 2048 ,36 2047 ,14 2046 ,65	3 3 3 4	35,03 28,32 34,39 35,03 34,68	41,04 34,34 40,44 41,09 40,74	$\begin{array}{c} 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3d' \ [^{2}1/_{2}]^{\circ} - 4p \ [^{2}1/_{2}] \\ 4p \ [^{2}1/_{2}] - 4d \ [^{3}1/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}1/_{2}] - 5s \ [^{1}1/_{2}]^{\circ} \end{array}$	1-0 3-3 2-3 1-1 2-1
2041,61 2038,35 2033,46 2030,01 2027,72	4 3 4 1 2	28,32 28,87 34,34 28,87 34,54	34,39 34,95 40,44 34,97 40,65	$\begin{array}{c} 3d' \left[2^{1}/_{2} \right]^{\circ} - 4p \left[2^{1}/_{2} \right] \\ 3d' \left[1^{1}/_{2} \right]^{\circ} - 4p' \left[1^{1}/_{2} \right] \\ 4p \left[2^{1}/_{2} \right] - 4d \left[3^{1}/_{2} \right]^{\circ} \\ 3d' \left[1^{1}/_{2} \right]^{\circ} - 4p \left[1^{1}/_{2} \right] \\ 4p \left[1^{1}/_{2} \right] - 5s \left[1^{1}/_{2} \right]^{\circ} \end{array}$	$ \begin{array}{r} 3-2 \\ 1-2 \\ 3-3 \\ 1-0 \\ 1-2 \end{array} $
2026,68 2020,83 2018,77 2014,10 2009,90	2 3 4 3 1	34,97 34,54 34,95 28,19 28,87	41,09 40,68 41,09 34,34 35,03	$\begin{array}{c} 4p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 4d \ [^{2}/_{2}]^{\circ} \\ 4p' \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3d' \ [^{1}/_{2}]^{\circ} - 4p \ [^{2}/_{2}] \\ 3d' \ [^{1}/_{2}]^{\circ} - 4p' \ [^{1}/_{2}] \end{array}$	0-1 $1-2$ $2-1$ $2-3$ $1-1$
2003,09 2000,96 1999,79 1989,61 1978,63	3 4 4 2 3	34,85 34,54 28,19 34,85 34,39	41,04 40,74 34,39 41,09 40,65	$4p' [1^{1}/_{2}] - 5s' [1^{1}/_{2}]^{\circ}$ $4p [1^{1}/_{2}] - 5s [1^{1}/_{2}]^{\circ}$ $3d' [1^{1}/_{2}]^{\circ} - 4p [2^{1}/_{2}]$ $4p' [1^{1}/_{2}] - 5s' [1^{1}/_{2}]^{\circ}$ $4p [2^{1}/_{2}] - 5s [1^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \\ 2 - 2 \\ 1 - 1 \\ 2 - 2 \end{array} $

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
1972,01 1968,03 1964,70 1958,18 1953,06	1 5 5 2 4	34,39 33,75 34,34 34,34 28,00 34,39	40,68 40,04 40,65 40,68 34,34 40,74	$4p [2^{1}/_{2}]-4d [2^{1}/_{2}]^{\circ}$ $4p [1/_{2}]-4d [1/_{2}]^{\circ}$ $4p [2^{1}/_{2}]-5s [1^{1}/_{2}]^{\circ}$ $4p [2^{1}/_{2}]-4d [2^{1}/_{2}]^{\circ}$ $3d' [2^{1}/_{2}]^{\circ}-4p [2^{1}/_{2}]$ $4p [2^{1}/_{2}]-5s [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 3-2 \\ 3-2 \\ 2-3 \\ 2-1 \end{array} $
1952,16 1948,31 1943,12 1939,72 1935,79	3 5 6 4 3	28,19 28,32 33,75 28,00 34,68	34,54 34,68 40,13 34,39 41,09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 3—2 1—2 2—2 2—1
1910,17 1907,46 1894,17 1892,92 1872,39	4 2 3 1 5	28,19 34,54 28,00 27,84 34,95	34,68 41,04 34,54 34,39 41,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-2 \\ 1-0 \\ 2-1 \\ 1-2 \\ 2-3 \end{array} $
1870,28 1860,50 1854,72 1849,51 1828,43	6 3 6 2 1	28,32 28,19 28,00 27,84 28,19	34,95 34,85 34,68 34,54 34,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 3-2 \\ 2-1 \\ 2-2 \\ 1-1 \\ 2-0 \end{array} $
1812,17 1807,91 1800,24 1794,31 1783,92	5 5 4 4 4	{ 27,84 28,19 28,00 34,68 33,74 28,00	34,68 35,03 34,85 41,57 40,65 34,95	$\begin{array}{c} 3d \left[1^{1}/_{2} \right]^{\circ} - 4p \left[1^{1}/_{2} \right] \\ 3d' \left[1^{1}/_{2} \right]^{\circ} - 4p' \left[1^{1}/_{2} \right] \\ 3d' \left[2^{1}/_{2} \right]^{\circ} - 4p' \left[1^{1}/_{2} \right] \\ 4p \left[1^{1}/_{2} \right] - 4d' \left[2^{1}/_{2} \right]^{\circ} \\ 4p \left[1^{1}/_{2} \right] - 5s \left[1^{1}/_{2} \right]^{\circ} \\ 3d' \left[2^{1}/_{2} \right]^{\circ} - 4p' \left[1^{1}/_{2} \right] \end{array}$	1-2 $2-1$ $2-1$ $2-2$ $1-2$ $2-2$
1773,29 1762,14 1744,61 1738,56 1726,88	3 3 3 1	33,74 28,00 27,84 27,84 34,39	40,74 35,03 34,95 34,97 41,57	$\begin{array}{c} 4p \ [^{1}/_{2}] - 5s \ [^{1}/_{2}] ^{\circ} \\ 3d' \ [^{2^{1}}/_{2}] ^{\circ} - 4p' \ [^{1}/_{2}] \\ 3d \ [^{1}/_{2}] ^{\circ} - 4p' \ [^{1}/_{2}] \\ 3d \ [^{1}/_{2}] ^{\circ} - 4p \ [^{1}/_{2}] \\ 4p \ [^{2^{1}}/_{2}] - 4d' \ [^{2^{1}}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 1 - 2 \\ 1 - 0 \\ 2 - 3 \end{array} $
1716,23 1698,95 1688,81 1595,24 1586,19	1 1 1 1 4	34,34 33,74 33,74 26,57 26,57	41,57 41,04 41,09 34,34 34,39	$\begin{array}{c} 4p \ [2^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 4p \ [^{1}/_{2}] - 5s' \ [^{1}/_{2}]^{\circ} \\ 3d \ [2^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \\ 3d \ [2^{1}/_{2}]^{\circ} - 4p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 3-3 \\ 1-0 \\ 1-1 \\ 2-3 \\ 2-2 \end{array} $
1571,31 1562,50 1555,48 1528,89 1506,94	5 6 4 0 3	26,45 26,45 26,57 26,57 26,45	34,34 34,39 34,54 34,68 34,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 3-3 \\ 3-2 \\ 2-1 \\ 2-2 \\ 3-2 \end{array} $
1496,92 1484,92 1480,55 1463,41 1459,87	2 4 2 4 3	26,57 25,39 26,57 25,27 26,45	34,85 33,74 34,95 33,74 34,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 2—1 2—2 1—1 3—2
1385,39 1359,81 1355,37 1334,94 1317,60	2 1 1 3 2	25,39 25,27 25,39 25,39 25,27	34,34 34,39 34,54 34,68 34,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-3 \\ 1-2 \\ 2-1 \\ 2-2 \\ 1-2 \end{array} $
1310,58 1297,96 1281,50 1278,38 1270,54 1035,366	1 3 2 2 2 2 4	25,39 25,39 25,27 25,27 25,27	34,85 34,95 34,95 34,97 35,03	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 2—2 1—2 1—0 1—1
1034,848	3	_		-	_

		 			
λ, Å	I	E _H , eV	E _B , eV	Transition	J
1031,760 1028,560 1019,371	4 4 2	<u>-</u>	— —	_ _ _	_ _ _
1014,998 998,397 987,336 984,935	3 3 5 4	_ _ _	_ _ _	 	
977,544 917,278 916,917	2 2 2	_ _ _	- -	 	_ _ _
906,615 894,351 890,892 883,159	2 4 2 3	 	 		Ξ
864,695 856,791 856,635	4 4 4	_ _ _ _	_ _ 	 	=
850,966 846,611 840,921 772,641	3 3 3 2	- -		_ _ _ 	
740,555 696,206 695,824	3 3 4	- -	_ _ _	- -	_ _ _
688,907 686,190 681,908 653,720	3 2 4 4	_ _ _ _	_ _ _	 	
639,230 633,187 629,355 621,279	6 5 4 3	_ _ _	_ _ _	_ _ _	_ _ _
612,062 610,740 608,895	5 3 3	_ _ _	_ 	- 	- -
607,069 606,333 603,622 596,223	3 2 3	- -	 	=	- - -
594,640 591,449 587,311 586,880	2 3 3 3 2	_ _ _ _	_ _ _ _	_ _ _ _	_ _ _ _
575,580 574,398 572,691 570,291 561,670	6 3 4 2 3	_ _ _ _	 	 	- - - -
561,518 557,112 556,583 556,215 554,615	3 3 3 2 3	- - -		 	_ _ _ _ _
550,004 549,201 545,091 536,132 534,715	3 4 2 4 4	- 	_ _ _ _	_ 	_ _ _ _
5.51,710	•				409

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
528,286	8		_	_	
490,546	$ar{2}$	00,00	25,27	$3p^{6} {}^{1}S - 3d [{}^{1}/{}_{2}]^{\circ}$	0—1
478,305	4	<u> </u>	<u> </u>	· —	
464,830	3	_	_	<u> </u>	-
971, 409	18	00,00	30,24	$3p^{6} {}^{1}S - 4s [1^{1}/_{2}]^{\circ}$	0—1
403,732	20	0,00	30,71	$3p^{6} {}^{1}S - 4s' {}^{1}/_{2}$	0—1
396,382	$\ddot{3}$	-	-	_	_
392,420		_	_	_	_
369,647	$\frac{2}{5}$	_	_	-	
368,303	3	_		_	_
357,973	8	_	_	_	_
344,219	2	_		_	_
340,389	3	_	_	_	_
304,330	3	0,00	40,74	$3p^{6} {}^{1}S - 5s [1^{1}/_{2}]^{\circ}$	0-1
301,741	4	0,00	41,08	$3p^{6} {}^{1}S - 5s' [{}^{1}/{}_{2}]^{\circ}$	1—1
248,636	4	_			_
242,384	$\bar{3}$		_		_

Ca IV, ground state $1s^2 2s^2 2p^6 3s^2 3p^{5 2}P_{3/2}^0$ Ionization potential 542 000 cm $^{-1}$; 67,196 eV

	-			•	
λ, Å	I	E _H , eV	E _B , eV	Transition	J
1030 ,273 1029 ,566 1027 ,309 1024 ,339 1023 ,820	4 3 5 5 4	— — — —	_ _ _ _		
997,579 994,311 892,671 858,855 775,526	7 6 3 3 3	_ _ _ _	 	_ _ _ _	
669,725 656,038 635,318 565,463 538,967	10 15 8 3 2	0,39 0,00 — 18,90	18,90 18,90 — 40,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1/2}_{3/2}$ $^{1/2}_{1/2}$ $^{-1/2}_{2}$ $^{-1/2}_{2}$ $^{-3/2}$
538,648 537,004 536,790 536,531 535,647	3 2 2 2 4	_ _ _ _	_ _ _ _	_ 	_ _ _ _ _
456,981 450,565 445,018 444,766 443,821	5 10 1 3 15	$0,39 \\ 0,00 \\ 0,39 \\ - \\ 0,39$	27,52 27,52 28,25 — 28,32	$3p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}F$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $ 3p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$	$^{1/_{2} - 3/_{2}} _{^{3/_{2} - 3/_{2}}} _{^{1/_{2} - 3/_{2}}} _{^{1/_{2} - 3/_{2}}}$
439,700 438,930 437,773 437,271 434,570	5 4 5 2 12	0,00 0,00 0,00 0,00 0,00	28,20 28,25 28,32 28,35 28,53	$3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{4}D$ $3p^{5} {}^{2}P^{\circ} - 3d {}^{2}D$	3/2 - 5/2 $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 1/2$ $3/2 - 5/2$
374,744 345,130	5 4	0,00	33,08	3p ⁵ ² P°—3d ² F	³ / ₂ — ⁵ / ₂ —

۸, Å	I	E _H , eV	E _B , eV	Transition	J
344,958 343,933	4 5	0,39	36,33	3p ⁵ ² P°—4s ⁴ P	1/ ₂ _3/ ₂
343,438	4	0,39	36,49	$3p^{5} {}^{2}P^{\circ}$ —4s ${}^{4}P$	$^{1}/_{2}$ — $^{1}/_{2}$
343,203 342,447 341,455	$\begin{matrix} 6 \\ 5 \\ 4 \end{matrix}$	00,00	36,12 —	$3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$	³ / ₂ — ⁵ / ₂
341 ,284 340 ,286	4 4 4	0,00	36,33 —	$3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$	3/2—3/ ₂
339,800 338,929 338,828	5 5 4	0,00 0,39	36,49 36,97	$3p^{5} {}^{2}P^{\circ}$ — $4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ}$ — $4s {}^{2}P$	$^{3/2}_{1/2}^{-1/2}_{3/2}$
336,555 335,374	$\begin{array}{c} 1\overline{5} \\ 2\overline{5} \end{array}$	$0,39 \\ 0,00$	37 ,22 36 ,97	$3p^{5} {}^{2}P^{\circ} \underline{\hspace{0.1cm}} 4s {}^{2}P \\ 3p^{5} {}^{2}P^{\circ} \underline{\hspace{0.1cm}} 4s {}^{2}P$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
333,057 332,808 332,531 331,991 331,442	2 3 5 5 4	0,00 0,39 0,39 —	37,22 37,64 37,64 —	$3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$ -	$ \begin{array}{c} 3/_2 - 1/_2 \\ 1/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
329,391 329,116 328,577	3 5 1	0,00 00,00	37,64 37,67	$3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 3d' {}^{2}S$	3/ ₂ —3/ ₂ 3/ ₂ —1/ ₂ —
321,593 318,392	10 4	$^{0,39}_{0,00}$	38 ,94 38 ,94	$3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D 3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
318,093 304,910	$\begin{array}{c} 15 \\ 3 \\ 4 \end{array}$	0,00 - 0,39	38 ,98 — 41 ,81	$3p^{5} {}^{2}P^{\circ}$ — $4s' {}^{2}D$ — $3p^{5} {}^{2}P^{\circ}$ — $4s'' {}^{2}S$	$\frac{^{3}/_{2}-^{5}/_{2}}{-}$ $\frac{^{1}/_{2}-^{1}/_{2}}{-}$
299 ,315 296 ,958 296 ,554	6 5	$\frac{0.39}{-0.00}$	41,81	$3p^{5} {}^{2}P^{\circ} - 4s'' {}^{2}S$	3/ ₂ —1/ ₂
251,354 250,153 249,408	3 3 3	0,39 0,00 0,00	49,71 49,56 49,71	$3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$	$^{1/2}_{3/2}^{3/2}_{5/2}$ $^{3/2}_{3/2}^{5/2}$

Ca V, ground state $1s^2 2s^2 2p^6 3s^2 3p^{4 3}P_2$ Ionization potential $680\,800$ cm⁻¹; 84,39 eV

	_				
λ, λ	I	E _H , eV	E _B , eV	Transition	J
1021 ,139	3	_		_	_
1021,103	4	_	_		_
1012,613	3	_	_	_	_
1009,638	$\ddot{3}$	_		_	_
1001,544	3	_	_	_	_
1000,310	6		_	<u></u>	_
994,946	3	_	_	_	
987,680	5		· —	_	_
975,825	4	_		_	
973,437	$\bar{6}$	_	_	-	_
	3		_	<u></u>	_
968,236 966,466	$\frac{3}{6}$	_	_		
962,896	9	_	_	_	_
842,950	$\frac{2}{3}$	_	_	_	_
821,583	ĭ		_	_	_
810,937	4			_	– ,
803,325	1	_	_	_	-
779.919	$\overset{1}{4}$		_	_	_
110.010	-				<u>.</u>

λ, Α	I	E _H , eV	$E_{ m B}$. eV	Transition	J
779,824 774,354	3 3	_		-	
774,088 748,409 730,257 727,646 676,775	5 3 5 1 1			 	_ _ _ _ _
671,365 656,763 651,550 647,876 646,570	6 6 5 5 8	0,30 0,41 0,30 0,00		$\begin{array}{c} - \\ 3p^4 \ ^3P - 3p^5 \ ^3P^\circ \end{array}$	 1-2 0-1 1-1 2-2
643,118 637,928 594,239 593,472 593,404	6 8 1 1 1	0,30 0,00 — — —	19,57 19,43 — — —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—0 2—1 — —
558,602 555,482 551,103 549,070 542,290	10 5 2 3 10	 	_ _ _ _	- - - -	_ _ _ _ _
530,303 528,746 509,293 476,606 446,036	6 3 2 2 1	 	 	_ _ _ _ _	_ _ _ _ _
445,933 425,000 387,077 381,606 380,396	1 15 5 3 5		37,46 33,00	$\begin{array}{c} - \\ - \\ 3p^{4} {}^{1}S - 3d'' {}^{1}P^{\circ} \\ - \\ 3p^{4} {}^{3}P - 3d {}^{3}D^{\circ} \end{array}$	
379,765 379,138 377,181 376,279 375,333	3 2 5 3 3	0,30 - 0,30 -	33,00 33,25 	$\begin{array}{c} - \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ - \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ - \end{array}$	1—1 — 1—2 —
374,000 372,904 371,225 356,246 352,915	4 6 6 5 9	$\begin{array}{c} - \\ 0,00 \\ 0,00 \\ 2,33 \\ 2,33 \end{array}$	 33,25 33,40 37,14 37,46	$\begin{array}{c} - \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ 3p^4 \ ^3P - 3d \ ^3D^{\circ} \\ 3p^4 \ ^1D - 3d'' \ ^3P^{\circ} \\ 3p^4 \ ^1D - 3d''' \ ^1P^{\circ} \end{array}$	$ \begin{array}{c} -\\ 2-2\\ 2-3\\ 2-1\\ 2-1 \end{array} $
343,640 338,056 337,541 336,554 335,344	4 5 4 4 5	2,33 0,30 0,41 0,30 0,00	38,44 36,97 37,14 37,14 36,97	$3p^{4} ^{1}D - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$	2-2 1-2 0-1 1-1 2-2
334,545 334,135 333,857 333,570 333,438	6 3 4 3 4	0,41 0,00 0,30	37,46 37,46 37,46	$3p^{4} ^{3}P - 3d'' ^{1}P^{\circ}$ $- 3p^{4} ^{3}P - 3d'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{1}P^{\circ}$ $$	0-1 - 2-1 1-1
330,937 325,282 325,020 324,477 324,110	6 5 3 5 3	$0,00 \\ 0,30 \\ 0,41 \\ -0,30$	37,46 38,41 38,55 — 38,55	$3p^{4} ^{3}P - 3d'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$ $ 3p^{4} ^{3}P - 3d'' ^{3}D^{\circ}$	2-1 1-2 0-1 - 1-1
323 ,223 322 ,757	6 5	0,00 0,00	38,36 38,41	$3p^4 \ ^3P - 3e''' \ ^3D^{\circ} \ 3p^4 \ ^3P - 3e''' \ ^3D^{\circ}$	2-3 2-2

λ, Å	I	E _H , eV	EB, eV	Transition	J
322,166 321,609 301,139	10 6 0		38,55 43,51	$3p^4 ^3P - 3d'' ^3D^{\circ} \ 3p^4 ^1D - 4s ^3S^{\circ}$	2—1 2—1
287,657 286,965 286,947 284,948 284,794	3 9 5 5 2	0,41 5,44 0,30 0,00 2,33	43,51 48,63 43,51 43,51 45,86	$3p^4 ^3P - 4s ^3S^{\circ}$ $3p^4 ^1S - 4s'' ^1P^{\circ}$ $3p^4 ^3P - 4s ^3S^{\circ}$ $3p^4 ^3P - 4s ^3S^{\circ}$ $3p^4 ^1D - 4s' ^3D^{\circ}$	01 01 11 21 23
280,992 272,982 272,336 272,265 271,440	8 4 3 5 1	2,33 0,41 0,30 0,30 2,33	46,46 45,82 45,82 45,83 48,00	$3p^{4} ^{1}D - 4s' ^{1}D^{\circ}$ $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{3}P - 4s' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 4s'' ^{3}P^{\circ}$	22 01 11 12 21
271,141 270,570 270,494 270,305 268,583	4 2 3 6 2	2,33 0,00 0,00 0,00 0,00 0,30	48,06 45,82 45,83 45,86 46,46	$\begin{array}{c} 3p^4 \ ^1D-4s'' \ ^3P^{\circ} \\ 3p^4 \ ^3P-4s' \ ^3D^{\circ} \\ 3p^4 \ ^3P-4s' \ ^3D^{\circ} \\ 3p^4 \ ^3P-4s' \ ^3D^{\circ} \\ 3p^4 \ ^3P-4s' \ ^1D^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-2 \\ 2-3 \\ 1-2 \end{array} $
267,772 266,863 260,446 259,978 259,856	8 3 3 3	2,33 0,00 0,41 0,30 0,30	48,63 46,46 48,00 47,98 48,00	$3p^{4} ^{1}D - 4s'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 4s' ^{1}D^{\circ}$ $3p^{4} ^{3}P - 4s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 4s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 4s'' ^{3}P^{\circ}$	$ \begin{array}{r} 2-1 \\ 2-2 \\ 0-1 \\ 1-0 \\ 1-1 \end{array} $
259,576 258,251 257,976 200,860 200,512	3 5 3 5	0,30 0,00 0,00 0,41 0,30	48,06 48,00 48,06 62,13 62,13	$3p^4 \ ^3P - 4s'' \ ^3P^\circ \ 3p^4 \ ^3P - 4s'' \ ^3P^\circ \ 3p^4 \ ^3P - 4s'' \ ^3P^\circ \ 3p^4 \ ^3P - 5s \ ^3S^\circ \ 3p^4 \ ^3P - 5s \ ^3S^\circ$	$ \begin{array}{r} 1-2 \\ 2-1 \\ 2-2 \\ 0-1 \\ 1-1 \end{array} $
199,890 199,553 197,648 197,531 196,970	3 6 2 2 5	5,44 0,00 2,33 2,33 2,33	67,46 62,13 65,06 65,09 65,28	$3p^{4} ^{1}S - 5s'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 5s' ^{3}S^{\circ}$ $3p^{4} ^{1}D - 5s' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 5s' ^{3}D^{\circ}$ $3p^{4} ^{1}D - 5s' ^{1}D^{\circ}$	0-1 $2-1$ $2-2$ $2-3$ $2-2$
191,801 191,480 191,439 190,558 190,457	2 2 3 3 5	0,41 0,30 0,30 0,00 0,00	65,04 65,04 65,06 65,06 65,09	$3p^4 \ ^3P - 5s' \ ^3D^{\circ} \ 3p^4 \ ^3P - 5s' \ ^3D^{\circ}$	0-1 $1-1$ $1-2$ $2-2$ $2-3$
190,363 185,540 185,288 185,102 184,415 184,280	4 2 1 2 1 3	2,33 0,41 0,30 0,30 0,00 0,00	67,46 67,23 67,23 67,28 67,23 67,28	$3p^{4} ^{1}D - 5s'' ^{1}P^{\circ}$ $3p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $3p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$	2-1 0-1 1-0, 1 1-2 2-1 2-2

Ca VI, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^{3 \, 4} S_{3/2}^0$ Ionization potential 879 000 cm $^{-1}$; 109 eV

λ, Å	I	E _H , eV	E _B , eV	Transition	J
1032,612	2	-	_		
1021,508	$\frac{7}{4}$			<u>-</u>	_
1018,346	3	_		_	
975,055 969,652	3		-	_	
969,652	6	_	_		*****

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
916,682 860,827 854,923 817,058 816,805	2 2 3 2 2	- - - -	- - - -	_ _ _ _ _	- - - - -
811,480 778,718 777,508 775,966 774,532	1 1 1 3 3	 	 		
772,389 770,928 776,522 765,154 764,358	1 1 1 6 3	5,62 5,62 5,62	21,79 21.84	$\begin{array}{c} - \\ - \\ 3p^{3} {}^{2}P^{\circ} - 1 \\ - \\ 3p^{3} {}^{2}P^{\circ} - 2 \end{array}$	$ \begin{array}{c} -\\ 3/2 - 5/2\\ -\\ 3/2 - 3/2 \end{array} $
763,344 689,538 685,807 674,278 674,046	2 3 4 2 1		24,00	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}D$	- - 3/ ₂ 5/ ₂
641,883 633,815 629,594 617,517 614,015	2 2 2 4 3	0,00 0,00 0,00 —	19,31 19,56 19,69 —	$3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $3p^{3} {}^{4}S^{\circ} - 3p^{4} {}^{4}P$ $ -$	$ \begin{array}{c} 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
602,389 601,700 600,917 590,396 587,872	0 5 6 3 1	3,40 3,40 3,35 — —	23,98 24,00 23,98 — —	$3p^3 {}^{2}D^{\circ} - 3p^4 {}^{2}D$ $3p^3 {}^{2}D^{\circ} - 3p^4 {}^{2}D$ $3p^3 {}^{2}D^{\circ} - 3p^4 {}^{2}D$ -	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ \end{array} $
587,604 581,466 579,775 578,732 564,275 562,250 547,898 537,613	2 3 2 4 2 3 3 6	 5,62 5,62	27,67 28,68	$\begin{array}{c} - \\ - \\ - \\ - \\ - \\ - \\ 3p^3 ^2P^{\circ} - 3p^4 ^2P \\ - \\ 3p^3 ^2P^{\circ} - 3p^4 ^2S \end{array}$	$\begin{array}{c} - \\ - \\ - \\ - \\ - \\ - \\ 3/2 - \frac{3}{2} \\ - \\ 3/2 - \frac{1}{2} \end{array}$
536,008 505,199 400,824 399,925 396,917 396,055 390,137	0 8 3 0 2 2 3	5,55 5,62 5,55 5,62 5,55	28,68 28,68 36,55 36,55 36,85 36,85	$3p^{3} {}^{2}P^{\circ} - 3p^{4} {}^{2}S$ $ 3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$ $3p^{3} {}^{2}P^{\circ} - 3d {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
387,080 386,254 386,106 385,941 385,091 384,172	4 1 1 1 2 3	5,62 5,55 — — —	37,65 37,65 — — —	3p ³ ² P°—3 3p ³ ² P°—3 ———————————————————————————————————	3/ ₂ 1/ ₂
384,028 383,505 381,849 381,464 380,003	2 2 2 2 1		— — — —		-
378,745 378,653 378,551 373,997	1 1 1 7	3,40 3,40	= 36,40 36,55	$\begin{array}{c} - \\ - \\ 3p^3 \ ^2D^{\circ} - 3d \ ^2F \\ 3p^3 \ ^2D^{\circ} - 3d \ ^2P \end{array}$	$\frac{-}{-}$ $\frac{3}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{3}{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
373,700	3		_	_	_
373,418	5	3,35	36,55	$3p^{3} {}^{2}D^{\circ} - 3d {}^{2}P$	$^{3}/_{2}$ — $^{3}/_{2}$
370,022	7	3,35	36,85	$3p^{3} {}^{2}D^{\circ} - 3d^{2}P$	$3/2_{2}^{\prime}$ _1/2
367,371	$\dot{2}$	-	-		—
363,525	$\bar{2}$	5,62	39,72	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}S$	$^{3}/_{2}$ — $^{1}/_{2}$
362,788	1	5,55	39,72	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}S$	$^{1}/_{2}$ — $^{1}/_{2}$
362,612	4	5,62	39,81	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	3/2 - 5/2
361,645	$\dot{\hat{2}}$	-			
361,234	$\overline{2}$	5,55	39,87	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
361,114	$\bar{4}$			_	
358,153	3	_	_	_	_
350,394	1				_
349,494	1			_	_
348,927	1			_	_
348,650	1	5,62	41,18	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	$^{3}/_{2}$ — $^{1}/_{2}$
347,967	3	5,55	41 ,18	$3p^{3} {}^{2}P^{\circ} - 3d' {}^{2}P$	$^{1}/_{2}$ — $^{1}/_{2}$
347,431	1	_	_	_	_
347,334	1	_		_	_
347,005	4	5,62	41,35	$3p^3 {}^{2}P^{\circ} - 3d' {}^{2}P$	$^{3}/_{2}$ — $^{3}/_{2}$
346,335	2	5,55	41 ,35	$3p^3 {}^{2}P^{\circ} - 3d' {}^{2}P$	$^{1}/_{2}^{-}$ $^{-3}/_{2}^{-}$
340,528	8	3,40	39,81	$3p^{3} {}^{2}D^{\circ} - 3d' {}^{2}D$	⁵ / ₂ — ⁵ / ₂
340,037	$\overset{\circ}{4}$	3,35	39,81	$3p^3 {}^2D^{\circ} - 3d' {}^2D$	$\frac{3}{2}$ _5/2
339,940	4	3,40	39,87	$3p^3 {}^2D^{\circ} - 3d' {}^2D$	⁵ / ₂ — ³ / ₂
339,463	6	3,35	39,87	$3p^3 ^2D^{\circ} - 3d' ^2D$	$^{3}/_{2}$ — $^{3}/_{2}$
329,298	3	-		_	_
327,806	4	_		_	
327,175	2	_		_	_
321,110	1	_		-	
320,445	$\frac{2}{3}$				3/ 3/
316,947	3	5,62	44,73	$3p^3 {}^{2}P^{\circ} - 3d'' {}^{2}D$	3/2-3/2
316,389	0	5,55	44,73	$3p^3 ^2P$ °— $3d'' ^2D$	$^{1}/_{2}$ — $^{3}/_{2}$
316, 115	3	_			-
291,976	1				3/ 1/
251,816	1	5,62	54,85	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P 3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	$\frac{3}{2}$ _1 $\frac{1}{2}$ _1 $\frac{1}{2}$ _2
251,465	4	5,55	54,85		
250,265	4	5,62	55,16	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P$	$\frac{3}{2}$ $\frac{3}{2}$
249,914	$\overline{3}$	5,55	55,16	$3p^{3} {}^{2}P^{\circ} - 4s {}^{2}P 3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$
242,631	5	5,62	56,71	$3p^{3} 2P^{3} - 4s^{2} D$ $3p^{3} 2P^{3} - 4s^{2} D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
242,592	3	5,62	56,72	$3p^{3} {}^{2}P - 4s' {}^{2}D$ $3p^{3} {}^{2}P^{\circ} - 4s' {}^{2}D$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
242,265	3	5,55	56,72	$3p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{3}{2}-\frac{1}{2}}$
240,721	6	$\frac{3}{3},35$	54,85	$3p^{3} {}^{2}D^{3} - 4s {}^{2}P$ $3p^{3} {}^{2}D^{3} - 4s {}^{2}P$	$\frac{5}{2}$
239,535	7	$\frac{3,40}{25}$	55,16 55,16	$3p^{3} {}^{2}D - 4s {}^{2}P$ $3p^{3} {}^{2}D^{\circ} - 4s {}^{2}P$	3/2 - 3/2
239,296	0	$^{3,35}_{3,40}$	56,10 $56,71$	$3p^{3} {}^{2}D$ —4s ${}^{2}D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
232,531	5 6	$\frac{3,40}{3,35}$	56,71 $56,72$	$3p^3 {}^{2}D^{\circ} - 4s {}^{2}D$	3/2 - 3/2
232,282			53,79	$3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$	$\frac{3}{2}$ $\frac{1}{2}$
230,495	5 7	$00,00 \\ 00,0$	53,19 53,97	$3p^{3} 4S^{\circ} - 4s^{4}P$	3/2 - 3/2
229,734	7 7	0,00	54,23	$3p^{3} {}^{4}S^{\circ} - 4s {}^{4}P$	3/2 - 5/2
228,628	1	0,00	OI,20	OP 2 10 1	

Unclassified Lines of Calcium

λ, Å	I	Expected assignment	λ, Å	I	Expected assignment
1667,7	30		486,160	3	_
1545,7	3	_	485,636	3	
1402,9	10		484,368	3	_
1402,3	4		480,471	3	_
1393,4	8		461,085	5	
552,005	4		397,178	4	
542,842	$\hat{3}$	_	723, 209	3	_
042,042	· ·		_ ,		

TITANIUM, Z = 22

Ti I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 4s^2 ^3F_2$ Ionization potential 55 138, cm⁻¹; 6,836 eV

λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}},\;{ m eV}$	Transition	J
11973,88 11949,58	6 5	1 ,46 1 ,44	2,50 2,48	$b {}^{3}F - z {}^{3}D^{\circ} \\ b {}^{3}F - z {}^{3}D^{\circ}$	4—3 3—2
11892,85	5	1,43	2,47	$b^{3}F-z^{3}D^{\circ}$	2—1
11797,24 11780,54	$\frac{3}{4}$	1,43 1,44	$\frac{2,48}{2,50}$	$b {}^{3}F - z {}^{3}D^{\circ} b {}^{3}F - z {}^{3}D^{\circ}$	$\begin{array}{c} 2-2 \\ 3-3 \end{array}$
		1,44	2,50	0 - r — z -D	5— 5
50, 11539 11403, 89	5 8	_	_	-	-
11381,53	7		_		_
11292,43 11246,88	6 8	$\frac{3,14}{3,15}$	$^{4}_{4,24}$ $^{4}_{26}$	$y {}^{3}\!D^{\circ} - d {}^{3}\!P \ y {}^{3}\!D^{\circ} - d {}^{3}\!P$	$\begin{array}{c} 1 - 0 \\ 2 - 1 \end{array}$
11243,90				$y ^{3}D = a ^{3}P$ $y ^{3}D = d ^{3}P$	
11243,90	10 5	3,18 —	4,28	_	3—2 —
11095,79	5	3,14	4,26	$y {}^{3}D^{\circ} - d {}^{3}P$	1-1
11057,58 10990,70	$\frac{3}{3}$	$3,16 \\ 3,15$	4,28 4,28	$\begin{array}{c} z \ ^3P^{\circ}-d \ ^3P \\ y \ ^3D^{\circ}-d \ ^3P \end{array}$	$\begin{array}{c} 2-2 \\ 2-2 \end{array}$
10396,70	8	3,35		$y D - a F$ $x {}^3F^{\circ} - b {}^3G$	2—2 4—5
10833,66	$\overset{\circ}{3}$	$\frac{3,33}{3,72}$	4,49 4,86	$x \circ F = b \circ G$ $x \circ D \circ -f \circ F$	4—3 3—3
10820,31	5	3,33	4 ,48	$x {}^3F^{\circ}$ — $b {}^3G$	3—4
10817,35	5	$\begin{cases} 3,71 \\ 3,73 \\ 2,22 \end{cases}$	4 ,85 4 ,87	$x \stackrel{5}{-}D^{\circ} - f \stackrel{5}{-}F$ $x \stackrel{5}{-}D^{\circ} - f \stackrel{5}{-}F$	2—2 4—4
10793,65	3	3,32	4,47	$x^{3}F^{\circ}-b^{3}G$	2-3
10781,34	3	2,25	3,40	b 3P — x 3D $^{\circ}$	2—2
10774,92	12	$\left\{ \begin{array}{l} 3,70 \\ 0,82 \end{array} \right.$	4,85	$x {}^{5}D^{\circ} - f {}^{5}F$	0-1
40756 00	E	$\begin{array}{c} 0,82 \\ 2,24 \end{array}$	97, 1 3,39	$a \ {}^{5}F - z \ {}^{5}G^{\circ} \ b \ {}^{3}P - x \ {}^{3}D^{\circ}$	$\begin{array}{c} 2-2 \\ 1-1 \end{array}$
10756,90	5	70, 3 ا	4 ,85	$x {}^5D^{\circ}$ — $t {}^5F$	1-2
10741 ,77 10732 ,89	7 8	$\frac{3,71}{0,83}$	4,86 1,98	$x {}^5D^{\circ} - f {}^5F$ $a {}^5F - z {}^5G^{\circ}$	2—3 3—3
10731,11	6	3,72	4,87	$x ^5D^{\circ} - f ^5F$	3-4
10726,33	18	0,81	1,97	$a^{5}F$ — $z^{5}G^{\circ}$	$1-\frac{3}{2}$
10689,52 10677,04	15 10	$^{3,73}_{0,84}$	4,89	$x^{5}D^{\circ} - f^{5}F$	4-5
10661,61	20	$^{0,84}_{0,82}$	2,00 1,98	$a {}^5F - z {}^5G^{\circ} \ a {}^5F - z {}^5G^{\circ}$	4—4 2—3
10607,78	10	0,85	2,02	$a {}^{5}F - z {}^{5}G^{\circ}$	5—5
10584,66	$\begin{array}{c} 25 \\ 5 \end{array}$	$^{0,83}_{2,24}$	2,00	$a {}^{5}F - z {}^{5}G^{\circ}$	3-4
10565,97 $10553,02$	8	$\substack{2,24\\2,25}$	$3,41 \\ 3,42$	a ³ H—y ³ G° a ³ H—y ³ G°	4—3 5—4
10551,81	3	1,89	3,06	$a {}^{3}G - z {}^{1}G^{\circ}$	5-4
10496,14	30	0,84	2,00	$a {}^{5}F - z {}^{5}G^{\circ}$	4-5
10460,07 10396,85	10 25	$\overset{2,26}{0,85}$	$\substack{3,44\\2,04}$	${a\atop a}{^{3}H}-y{^{3}G^{\circ}\atop a}{^{5}F}-z{^{5}G^{\circ}}$	$6-5 \\ 5-6$
10257,30	3	3,72	$\frac{2}{4},93$	$x^{3}G^{\circ}-f^{3}F$	5—4
10189,26	3	1,46	2,68	$b^{3}F-z^{3}G^{\circ}$	4—4
10179,92 10170,60	$\frac{3}{3}$	3,89 1,44	5,11 $2,66$	$w\ {}^{3}G^{\circ}-e\ {}^{3}G \\ b\ {}^{3}F-z\ {}^{3}G^{\circ}$	3-3
10147,09	4	3,92	$\frac{2}{5},00$	$u^{\circ} G - e^{\circ} G$	3—3 5—5
10145,48	8	_		_	
10120,90 10119,20	10 3	2,17 $3,90$	3,40 5,13	$a {}^{3}D - x {}^{3}D^{\circ}$	3—2
10066,47	3 8	$\frac{3,90}{2,16}$	$\frac{3,13}{3,39}$	$w {}^{3}G^{\circ} - e {}^{3}G \\ a {}^{3}D - x {}^{3}D^{\circ}$	4—4 2—1
10059,87	12	1,43	2,66	b 3F — z 3G $^\circ$	2—3
10057,69 10050,11	$\frac{25}{5}$	2,17	3,41	$a ^3D - x ^3D ^{\circ}$	3—3
10030,11	12	_ 1,44	2,68	 b ³F—z ³G°	 3_4
10034,45	15	1,46	$\frac{2,00}{2,70}$	$b {}^{3}F - z {}^{3}G^{\circ}$	3—4 4—5
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
10011,72 10003,02 9997,94	15 25 15	2,15 2,16 1,87	3,39 3,40 3,11	$a \ ^{3}D - x \ ^{3}D^{\circ}$ $a \ ^{3}D - x \ ^{3}D^{\circ}$ $a \ ^{3}G - y \ ^{3}F^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 3 - 2 \end{array} $
9981,16 9948,98 9941,33 9927,35 9879,41	5 8 8 20 3	2,15 2,16 1,88 1,87	- 3,40 3,41 3,13 3,13	$a \ ^{3}D - x \ ^{3}D^{\circ}$ $a \ ^{3}D - x \ ^{3}D^{\circ}$ $a \ ^{3}D - x \ ^{3}F^{\circ}$ $a \ ^{3}G - y \ ^{3}F^{\circ}$	$ \begin{array}{r} -\\ 1-2\\ 2-3\\ 4-3\\ 3-3 \end{array} $
9832,15	25	1,89	3,15	$a\ {}^{3}G-y\ {}^{3}F^{\circ}\ z\ {}^{5}D^{\circ}-a\ {}^{5}D\ a\ {}^{5}F-z\ {}^{5}F^{\circ}\ a\ {}^{5}F-z\ {}^{5}F^{\circ}\ a\ {}^{5}F-z\ {}^{5}F^{\circ}$	5-4
9813,45	5	2,32	3,58		4-3
9787,67	50	0,83	2,09		3-2
9783,59	20	0,82	2,08		2-1
9783,30	40	0,84	2,10		4-3
9770,28	40	0,85	2,12	$a ^{5}F-z ^{5}F^{\circ} \ z ^{5}D^{\circ}-a ^{5}D \ z ^{5}D^{\circ}-a ^{5}D \ a ^{5}F-z ^{5}F^{\circ} \ z ^{5}D^{\circ}-a ^{5}D$	5-4
9768,22	5	2,31	3,57		3-2
9746,86	15	2,32	3,59		4-4
9743,60	50	0,81	2,08		1-1
9737,77	5	2,30	3,57		2-1
9728,36	60	0,82	2,09	$a {}^{5}F - z {}^{5}F^{\circ}$ $a {}^{1}G - z {}^{1}F^{\circ}$ $z {}^{5}D^{\circ} - a {}^{5}D$ $z {}^{5}D^{\circ} - a {}^{5}D$ $a {}^{5}F - z {}^{5}F^{\circ}$	2-2
9718,96	25	1,50	2,78		4-3
9717,00	10	2,31	3,58		3-3
9715,51	3	2,29	3,57		1-0
9705,64	80	0,83	2,10		3-3
9702,86 9688,86 9678,98 9675,55 9663,19	3 30 3 90 3	2,30 0,81 2,29 0,84 2,29	3,57 2,09 3,57 2,12 3,57	$z {}^{5}D^{\circ} - a {}^{5}D$ $a {}^{5}F - z {}^{5}F^{\circ}$ $z {}^{5}D^{\circ} - a {}^{5}D$ $a {}^{5}F - z {}^{5}F^{\circ}$ $z {}^{5}D^{\circ} - a {}^{5}D$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 0-1 \\ 4-4 \\ 1-2 \end{array} $
9661,42	10	2,17	3,46	$a\ ^{3}D-z\ ^{5}F^{\circ}\ a\ ^{5}F-z\ ^{5}F^{\circ}\ a\ ^{5}F-z\ ^{5}F^{\circ}\ y\ ^{5}F^{\circ}-f\ ^{5}F\ a\ ^{5}F-z\ ^{5}F^{\circ}$	3-3
9647,40	50	0,82	2,10		2-3
9638,28	100	0,85	2,13		5-5
9606,77	3	3,58	4,87		5-4
9599,53	50	0,83	2,12		3-4
9590 ,15	3	3,21	4,51	$y {}^{5}D^{\circ} - e {}^{5}F$ $y {}^{5}F^{\circ} - f {}^{5}F$ $y {}^{5}F^{\circ} - f {}^{5}F$ $a {}^{5}F - z {}^{5}F^{\circ}$ $y {}^{5}F^{\circ} - f {}^{5}F$	4-5
9588 ,77	4	3,57	4,86		4-3
9570 ,08	4	3,56	4,85		3-2
9546 ,07	50	0,84	2,13		4-5
9511 ,80	8	3,55	4,85		2-2
9511,55	10	3,55	4,85	y ⁵ F°—f ⁵ F	1-1
9510,81	12	3,56	4,86	y ⁵ F°—f ⁵ F	3-3
9508,49	20	3,57	4,87	y ⁵ F°—f ⁵ F	4-4
9506,04	25	3,58	4,89	y ⁵ F°—f ⁵ F	5-5
9453,22	3	3,55	4,86	y ⁵ F°—f ⁵ F	2-3
9431,77	3	3,56	4,87	$y \ ^{5}F^{\circ} - f \ ^{5}F$ $x \ ^{3}F^{\circ} - e \ ^{3}F$ $x \ ^{3}F^{\circ} - e \ ^{3}F$ $x \ ^{3}F^{\circ} - e \ ^{3}F$ $y \ ^{3}F^{\circ} - b \ ^{3}G$	3-4
9312,48	4	3,32	4,65		2-2
9285,04	5	3,33	4,67		3-3
9257,62	7	3,35	4,69		4-4
9246,14	10	3,35	4,49		4-5
9167,53 9123,14 9090,70 9027,32 8989,44	$\begin{array}{c} 8 \\ 5 \\ 25 \\ 45 \\ 12 \end{array}$	3,13 3,11 1,75 1,74 1,73	4,48 4,47 3,11 3,11 3,11	$y \ ^{3}F^{\circ}-b \ ^{3}G$ $y \ ^{3}F^{\circ}-b \ ^{3}G$ $a \ ^{5}P-z \ ^{5}S^{\circ}$ $a \ ^{5}P-z \ ^{5}S^{\circ}$ $a \ ^{5}P-z \ ^{5}S^{\circ}$	$ \begin{array}{r} 3-4 \\ 2-3 \\ 3-2 \\ 2-2 \\ 1-2 \end{array} $
8863,09 8821,14 8819,39 8794,40 8778,66	3 42 8 8 8 30	3,71 1,75 1,07 4,30 1,75	5,11 3,15 2,47 5,71 3,16	$x {}^{3}G^{\circ} - e {}^{3}G$ $a {}^{5}P - y {}^{3}D^{\circ}$ $a {}^{3}P - z {}^{3}D^{\circ}$ $z {}^{1}H^{\circ} - e {}^{1}G$ $a {}^{5}P - z {}^{3}P^{\circ}$	3-3 3-2 2-1 5-4 3-2

I	E _H , eV	E _B , eV	Transition	J
75 15 7 75 6	1,07 1,74 3,72 1,05 1,73	2,48 3,15 5,14 2,47 3,15	$a\ ^{3}P-z\ ^{3}D^{\circ}\ a\ ^{5}P-y\ ^{3}D^{\circ}\ x\ ^{3}G^{\circ}-e\ ^{3}G\ a\ ^{3}P-z\ ^{3}D^{\circ}\ a\ ^{5}P-y\ ^{3}D^{\circ}$	2—2 2—2 5—5 1—1 1—2
30 100 125 150 40	1,74 1,05 1,05 1,07	3,16 2,47 2,48 2,50	a ⁵ P-z ³ P° a ³ P-z ³ D° a ³ P-z ³ D° a ³ P-z ³ D°	$ \begin{array}{c} 2-2 \\ 0-1 \\ 1-2 \\ 2-3 \\ - \end{array} $
18 18 20 15 7	2,24 1,74	3,68 3,18	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 ——————————————————————————————————
25 60 15 50 25	{ 2,25 1,73 2,27 1,73 2,23 1,74	3,69 3,17 3,71 3,18 3,68 3,19	$b \ ^{3}P - w \ ^{3}D^{\circ}$ $a \ ^{5}P - y \ ^{5}D^{\circ}$ $b \ ^{1}G - x \ ^{3}G^{\circ}$ $a \ ^{5}P - y \ ^{5}D^{\circ}$ $b \ ^{3}P - w \ ^{3}D^{\circ}$ $a \ ^{5}P - y \ ^{5}D^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-0 \\ 4-3 \\ 1-1 \\ 0-1 \\ 2-2 \end{array} $
25 100 60 15 8	1,75 1,87 2,24 1,73	3,20 3,32 3,69 3,19	a ⁵ P-y ⁵ D° a ³ G-x ³ F° b ³ P-w ³ D° a ⁵ P-y ⁵ D°	$ \begin{array}{r} 3 - 3 \\ 3 - 2 \\ 1 - 2 \\ 1 - 2 \\ - \end{array} $
8 100 60 60 15	$ \begin{array}{c} -1,88 \\ 2,13 \\ 2,25 \\ 3,70 \\ 2,24 \end{array} $	3,33 3,59 3,71 5,16 3,70	$\begin{array}{c} - \\ a \ ^3G - x \ ^3F^{\circ} \\ z \ ^5F^{\circ} - a \ ^5D \\ b \ ^3P - w \ ^3D^{\circ} \\ a \ ^1F - v \ ^1F^{\circ} \\ b \ ^3P - x \ ^5D^{\circ} \end{array}$	 4-3 5-4 2-3 3-3 1-0
30 25 100 75 7	1,74 1,87 1,89 2,12	3,20 3,33 3,35 3,58	a ⁵ P-y ⁵ D° a ³ G-x ³ F° a ³ G-x ³ F° z ⁵ F°-a ⁵ D	2—3 3—3 5—4 4—3 —
40 75 20 75 300	1,75 2,25 2,25 2,26 0,84	3,21 3,72 3,72 3,72 2,31	$a \ ^{5}P - y \ ^{5}D^{\circ}$ $a \ ^{3}H - x \ ^{3}G^{\circ}$ $b \ ^{3}P - x \ ^{5}D^{\circ}$ $a \ ^{3}H - x \ ^{3}G^{\circ}$ $a \ ^{5}F - z \ ^{5}D^{\circ}$	3-4 5-4 2-3 6-5 4-3
300 200 50 20 10	0,85 0,83 2,10 1,88	2,32 2,30 3,57 3,35 —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5-4 3-2 3-2 4-4
25 60 150 5 90	2,12 2,24 0,82 2,25 0,81	3,59 3,71 2,29 3,72 2,29	$z {}^{5}F^{\circ} - a {}^{5}D$ $a {}^{3}H - x {}^{3}G^{\circ}$ $a {}^{5}P - z {}^{5}D^{\circ}$ $a {}^{3}H - x {}^{3}G^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$	4-4 4-3 2-1 5-5 1-0
25 90 100 100 3	2,09 0,81 0,82 0,83 3,34	3,57 2,29 2,30 2,31 4,89	$z {}^{5}F^{\circ} - a {}^{5}D$ $a {}^{5}F - z {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$ $y {}^{5}G^{\circ} - f {}^{5}F$	$ \begin{array}{r} 2-1 \\ 1-1 \\ 2-2 \\ 3-3 \\ 6-5 \end{array} $
	75 15 77 75 6 30 400 125 150 40 18 18 20 15 7 25 60 15 50 25 100 60 15 8 8 400 60 60 15 7 7 40 75 20 75 300 200 500 500 500 500 500 500 500 500 5	75	75	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

λ, Α	I	E _H , eV	EB, eV	Transition	J
7978,88 7949,17 7440,60 7357,74 7344,72	4 3 3 3 4	1,89 3,32 1,50 2,26 1,44 1,46	3,44 4,87 3,06 3,92 3,13 3,15	$a\ {}^3G-y\ {}^3G^\circ \ y\ {}^5G^\circ-f\ {}^5F \ a\ {}^1G-z\ {}^1G^\circ \ a\ {}^3H-w\ {}^3G^\circ \ b\ {}^3F-y\ {}^3F^\circ \ b\ {}^3F-y\ {}^3F^\circ$	5—5 5—4 4—4 6—5 3—3 4—4
7251,74 7244,86 7216,20 7209,44 7038,80	8 10 5 20 6	1,43 1,44 1,44 1,46 2,34	3,14 3,15 3,16 3,18 4,11	$b\ ^{3}F-y\ ^{3}D^{\circ}\ b\ ^{3}F-y\ ^{3}D^{\circ}\ b\ ^{3}F-z\ ^{3}P^{\circ}\ b\ ^{3}F-y\ ^{3}D^{\circ}\ c\ ^{3}P-x\ ^{3}P^{\circ}$	$ \begin{array}{r} 2-1 \\ 3-2 \\ 3-2 \\ 4-3 \\ 2-2 \end{array} $
6861,47	6	2,27	4,07	$b {}^{1}G - y {}^{1}F^{\circ}$ $a {}^{1}D - z {}^{1}D^{\circ}$ $a {}^{1}D - z {}^{1}F^{\circ}$ $a {}^{1}H - y {}^{1}G^{\circ}$ $b {}^{3}F - x {}^{3}F^{\circ}$	4—3
6743,124	10	0,90	2,74		2—2
6599,112	12	0,90	2,78		2—3
6575,180	3	2,58	4,46		5—4
6556,066	25	1,46	3,35		4—4
6554,236	20	1,44	3,33	$b\ ^3F - x\ ^3F^{\circ} \ b\ ^3F - x\ ^3D^{\circ}$	3-3
6546,276	20	1,43	3,32		2-2
6508,135	3	1,43	3,33		2-3
6497,689	3	1,44	3,35		3-4
6366,354	8	1,46	3,41		4-3
6359,896	8	0,05	2,00	$a\ {}^{3}F-z\ {}^{5}G^{c}\ b\ {}^{3}F-x\ {}^{3}D^{c}\ a\ {}^{3}F-z\ {}^{5}G^{o}\ b\ {}^{3}F-x\ {}^{3}D^{o}\ b\ {}^{3}F-x\ {}^{3}G^{o}$	4-4
6336,104	8	1,44	3,40		3-2
6325,22	10	0,02	1,98		3-3
6318,027	5	1,43	3,39		2-1
6312,240	10	1,46	3,42		4-4
6303,754 6296,646 6273,389 6261,101 6258,706	$10 \\ 12 \\ 6 \\ 35 \\ 50$	1,44 0,00 0,02 1,43 1,46	3,41 1,97 2,00 3,41 3,44	$b\ ^3F-y\ ^3G^{\circ}\ a\ ^3F-z\ ^5G^{\circ}\ a\ ^3F-z\ ^5G^{\circ}\ b\ ^3F-y\ ^3G^{\circ}\ b\ ^3F-y\ ^3G^{\circ}$	3-3 2-2 3-4 2-3 4-5
6258,103	40	1,44	3,42	$b\ ^{3}F-y\ ^{3}G^{\circ}\ z\ ^{3}G^{\circ}-e\ ^{3}F\ z\ ^{3}G^{\circ}-e\ ^{3}F\ z\ ^{3}G^{\circ}-e\ ^{3}F\ a\ ^{3}D-w\ ^{3}F^{\circ}$	3-4
6221,41	8	2,66	4,65		3-2
6220,460	12	2,68	4,67		4-3
6215,212	20	2,70	4,69		5-4
6186,14	3	2,17	4,18		3-4
6146,225	3	1,87	3,89	$a\ {}^{3}G-w\ {}^{3}G^{\circ}\ a\ {}^{3}P-z\ {}^{3}S^{\circ}\ a\ {}^{3}G-w\ {}^{3}G^{\circ}\ z\ {}^{1}G^{\circ}-e\ {}^{1}F\ a\ {}^{3}G-w\ {}^{3}G^{\circ}$	3-3
6126,217	20	1,07	3,09		2-1
6121,008	3	1,88	3,90		4-4
6098,665	7	3,06	5,09		4-3
6092,814	4	1,89	3,92		5-5
6091,175	20	2,27	4,30	$\begin{array}{c} b {}^{1}G - z {}^{1}H^{\circ} \\ a {}^{3}P - z {}^{3}S^{\circ} \\ a {}^{3}P - z {}^{3}S^{\circ} \\ a {}^{3}H - z {}^{1}H^{\circ} \\ a {}^{3}D - v {}^{3}F^{\circ} \end{array}$	4-5
6085,228	20	1,05	3,09		1-1
6064,631	9	1,05	3,09		0-1
5999,668	8	2,24	4,30		4-5
5999,003	4	2,17	4,24		3-4
5978,543	25	1,87	3,95	a ³ G-z ³ H°	$ \begin{array}{r} 3-4 \\ 4-5 \\ 5-6 \\ 1-1 \\ 2-2 \end{array} $
5965,828	30	1,88	3,96	a ³ G-z ³ H°	
5953,162	30	1,89	3,97	a ³ G-z ³ H°	
5941,755	12	1,05	3,14	a ³ P-y ³ D°	
5937,806	6	1,07	3,15	a ³ P-y ³ D°	
5929,27	3	3,58	5,67	$y {}^{5}F^{\circ} - f {}^{5}G$ $v {}^{3}D^{\circ} - j {}^{5}F$ $a {}^{3}P - y {}^{3}D^{\circ}$ $b {}^{3}P - x {}^{1}D^{\circ}$ $a {}^{3}P - z {}^{3}P^{\circ}$	5-5
5924,42	3	3,87	5,96		1-1
5922,112	18	4,05	3,14		0-1
5919,06	10	2,25	4,34		2-2
5918,548	10	1,07	3,16		2-2
5916,18 5915,123	5 9	$^{2}_{2,26}$	4,87 4,42	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 6-6

λ, Å	I	E _H , eV	E _B , eV	Transition	J
5914,93	5	$\left\{\begin{array}{c} 3,87\\ 3,57 \end{array}\right.$	5,96 5,66	v ³ D°—j ⁵ F y ⁵ F°—f ⁵ G	3-2 4-3
5911,55	3 4	3, 19	5,28	$y \stackrel{F}{=} \stackrel{F}{=} \stackrel{G}{=} 0$ $y \stackrel{5}{=} \stackrel{5}{=} \stackrel{F}{=} \stackrel{G}{=} 0$ $y \stackrel{5}{=} \stackrel{F}{=} \stackrel{G}{=} \stackrel{G}{=} 0$	2—1 4—4
5907,83		3,57 $1,46$	5,67 $3,56$	$b^{3}F-y^{5}F^{\circ}$	4—4 4—3
5906,35 5904,35	5 4	$\substack{ \{ \begin{array}{c} 1,46 \\ 3,20 \\ 3,21 \end{array} }$	5,30 5,31	$y {}^{5}\!D^{\circ} - e {}^{5}\!P \ y {}^{5}\!D^{\circ} - e {}^{5}\!P$	3-2 4-3
5903,317	5	1,07	3,17	$a^{3}P-z^{3}P^{\circ}$	2—1
$5900,80 \ 5899,295$	$\frac{4}{25}$	$3,95 \\ 1,05$	$6,\!05 \ 3,\!15$	$z {}^{3}H^{\circ} - k {}^{5}F$ $a {}^{3}P - y {}^{3}D^{\circ}$	4—5 1—2
5889,96	8	$\begin{cases} 3,90 \\ 2,24 \end{cases}$	5,99	$w^{3}G^{\circ}-j^{5}F$	4-5
5889,05	3	$\frac{(2,24)}{3,18}$	$\frac{4,34}{5,28}$	$b^{3}P - x^{1}D^{\circ}$ $y^{5}D^{\circ} - e^{5}P$	$ \begin{array}{c} 1-2 \\ 1-1 \end{array} $
5885,05	3	3,56	5,66	$y^{5}F^{\circ}$ — $f^{5}G$	3-3
$5880,306 \ 5874,42$	5 3	$^{1}_{3},^{05}_{87}$	3,16 5,98	$a {}^{3}P - z {}^{3}P^{\circ}$ $v {}^{3}D^{\circ} - j {}^{5}F$	$\begin{array}{c} 1-2 \\ 2-3 \end{array}$
5872,36	10	$\left\{ \begin{array}{l} 3.34 \\ 3.19 \end{array} \right.$	$\frac{5,47}{5,30}$	$y {}^5G^{\circ} - f {}^5II$ $y {}^5D^{\circ} - e {}^5P$	6-7
5871,18	6	2,49	4,60	$y \cdot D = e \cdot P$ $a \cdot P - w \cdot ^3P \circ$	2—2 1—0
5869,23	3	$\left\{ \begin{array}{l} 1,07 \\ 3,94 \end{array} \right.$	3,18 $6,06$	$a {}^{3}P - y {}^{5}D^{\circ}$ $y {}^{3}P^{\circ} - e {}^{3}D$	$\begin{array}{c} 2-1 \\ 2-3 \end{array}$
5866,453	35	1,07	3,18	$a^{3}P-y^{3}D^{\circ}$	2—3 2—3
5865,32	6	$\left\{ egin{array}{c} 3,57 \ 1,05 \end{array} ight.$	$\begin{array}{c} 5,68 \\ 3,17 \end{array}$	$y {}^{5}F^{\circ} - \mathring{f} {}^{3}H$ $a {}^{3}P - z {}^{3}P^{\circ}$	4—5 1—1
5859,71	4	$\{\begin{array}{c} 3,34 \\ 2,20 \end{array}$	5,45	$y {}^{5}G^{\circ} - f {}^{5}H$	6-5
5847,12	10	1 3,20 1,07	5,31 $3,19$	$y {}^{5}D^{\circ} - e {}^{5}P$ $a {}^{3}P - y {}^{5}D^{\circ}$	$\begin{array}{c} 3-3 \\ 2-2 \end{array}$
5839,73	4	1,46	3,58	$b^{3}F-y^{5}F^{\circ}$	4-5
5838 ,03 5837 ,34	$\frac{12}{6}$	$\substack{3,06\\3,55}$	$\frac{5,18}{5,67}$	$z {}^{1}G^{\circ} - e {}^{5}G$ $y {}^{5}F^{\circ} - h {}^{5}F$	4-4 2-1
5829 ,86 5827 ,28	$\frac{5}{3}$	1,44	3,57	$b {}^{3}F - y {}^{5}F^{\circ}$	3-4
5823,679	3	$\substack{1,74\\2,27}$	3,87 4,40	$a {}^{5}P - v {}^{3}D^{\circ} \\ b {}^{1}G - y {}^{3}H^{\circ}$	2—1 4—4
5819,96 5817,88	$\frac{8}{6}$	1,74	3,87	$a^{5}P - v^{3}D^{\circ}$	2-3
5816,86	6	$3,90 \\ 3,30$	6,03 $5,44$	$w \ ^3G^{\circ}$ — $k \ ^5F$ $y \ ^5G^{\circ}$ — $f \ ^5H$	4—4
5810,08	3	1,05	3,19	$a^{3}P-y^{5}D^{\circ}$	$\begin{array}{c} 4-3 \\ 1-2 \end{array}$
5807,23 5804,265	8 5	$\frac{3,20}{3,34}$	$\substack{5,31\\5,47}$	y ⁵ D°—e ⁵ P y ⁵ G°—f ⁵ H	3-3
5798,44	4	3,72	5,86	$x {}^{3}G^{\circ} - g {}^{5}G$	$\begin{array}{c} 6-7 \\ 5-5 \end{array}$
5791,26 5788,08	7 5	$2,49 \\ 2,27$	$\substack{4,63\\4,41}$	$a\ ^{1}P-w\ ^{3}P^{\circ}\ b\ ^{1}G-y\ ^{3}H^{\circ}$	1-2
5785,979	5	3,32	5,46	y ⁵ G°—f ⁵ II y ⁵ G°—f ⁵ II	4—5 5—6
$5785,66 \\ 5784,38$	$\frac{25}{3}$	$\substack{3,29 \ 3,20}$	5,44 $5,34$	$y {}^5G^{\circ} - f {}^5II$ $y {}^5D^{\circ} - g {}^5F$	3—3 3—2
5783,68	3	3,15	5,30	$y {}^{3}D^{\circ} - e {}^{5}P$	2—2
5780,70	12	$\left\{\begin{array}{l} 3,14\\2,25\\ \end{array}\right.$	5,28 4,39	y ³ D°—e ⁵ P b ³ P—y ³ S°	$\begin{array}{c} 1 - 1 \\ 2 - 1 \end{array}$
5776,96	3	$\left\{\begin{array}{l} 3,21\\ 3,59 \end{array}\right.$	5,36 5,73	$y \stackrel{5}{-}D^{\circ} - \stackrel{\circ}{g} \stackrel{5}{-}F$ $a \stackrel{5}{-}D - u \stackrel{1}{-}G^{\circ}$	4-4
5774 ,54 5774 ,037	13 5	2,25 3,30	4,40 5,45	$a \ ^{3}H - y \ ^{3}H^{\circ}$ $y \ ^{5}G^{\circ} - f \ ^{5}H$	4-4 5-4 4-5
5771,28 5766,330	$\frac{6}{4}$	$\frac{4,51}{3,29}$	6,65 5,44	$y^{5}P^{\circ}-e^{1}P$	2—1
5763,52	3	2,51	4,66	y ⁵ G°—f ⁵ H b ¹ D—v ³ G°	$\begin{array}{c} 3-4 \\ 2-3 \end{array}$
5762,295	4	{ 1,74 3,28	3,89 5,44	$a {}^{5}P - w {}^{3}G^{\circ}$ $y {}^{5}G^{\circ} - f {}^{5}II$	2-3
5756,45	6	$^{3,26}_{2,26}$	4,41	$a \ ^3H - y \ ^3H^\circ$	2—3 6—5
20				-	

λ. ἴ	1	E _H , eV	E _B , eV	Transition	J
5751,74	4	$\begin{cases} 3,19 \\ 3,79 \end{cases}$	5,34	y ⁵ D°−g ⁵ F z ¹ F°−t ³ F	$\frac{2-2}{3-4}$
5751,05	3	$\begin{array}{c} 1,78 \\ 1,75 \end{array}$	4,93 3,90	$a \stackrel{5}{-} P - w \stackrel{3}{-} G^{\circ}$	3—4 3—4
5745,07	8	$\frac{1}{2}, \frac{7}{32}$	4,48	$z {}^{5}D^{\circ} - e {}^{5}F$	4-3
5744,47	$\frac{5}{5}$	$\frac{2,02}{3,21}$	5,37	$y \stackrel{5}{D}^{\circ} - g \stackrel{5}{F}$	4-5
5739 ,975	4	$\frac{2}{2}, \frac{7}{24}$	4,40	$a^{3}H-y^{3}H^{\circ}$	4—4
5739,464	9	2,25	4,41	$a^{3}H-y^{3}H^{\circ}$	5-5
5735,77	3	3,17	5,34	$y^{5}D^{\circ}-g^{5}F$	0-1
5734,95	3	2,25	4,41	$b^{3}P-w^{5}D^{\circ}$	2-2
5734,24	i 0	$\{2,30$	4,46	$z {}^{5}D^{\circ} - e {}^{5}F$	2-1
		$\begin{cases} 2,30\\ 3,20 \end{cases}$	5,36	$y_{130}^{5} - g_{300}^{5}$	3-4
5731,08	4	2,23	4,39	$b ^3P - y ^3S^{\circ}$	0—1
5730,51	3	$ \left\{ \begin{array}{c} 2,51 \\ 3,18 \\ 2,74 \end{array} \right. $	4,67 5,34 4,00	$b {}^{1}D - u {}^{3}F^{\circ}$ $y {}^{5}D^{\circ} - g {}^{5}F$ $z {}^{1}D^{\circ} - f {}^{3}F$	$\begin{array}{c} 2-2 \\ 1-2 \\ 2-2 \end{array}$
5728,25	4	$\frac{2,14}{2,09}$	$^{4},90$ $^{4},26$	$z \stackrel{\circ}{-} D \stackrel{-}{-} I$	$\frac{2-2}{2-1}$
5721,80	4	$\frac{2}{3}$	$\frac{1}{4},50$	$c^{3}P-y^{5}P^{\circ}$	$\bar{1} - \bar{1}$
5720,445	3	2,29	4,46	z $^5D^{\circ}$ — $e^{-5}F$	1—1
5716,450	4	2,30	4,46	z $^5D^{\circ}$ — e 5F	2—2
5715,123	9	2,26	4,42	a ³H−y ³H°	6—6
5713,895	3	2,29	4,46	$z {}^{5}D^{\circ} - e {}^{5}F$	0-1
5711,852	4	2,31	4,48	$z {}^{5}D^{\circ} - e {}^{5}F$	3-3
5710,68	3	$\frac{2}{3}$, $\frac{32}{44}$	$\frac{4}{5},49$	$z {}^{5}D^{\circ} - b {}^{3}G$	4—5 2—1
5709,95	3	3,11	5,28	z ${}^5S^{\circ}$ — e 5P	
5709,33	4	2,08	4,26	$z {}^{5}F^{\circ} - d {}^{3}P$	1-1
5708 ,199	3	2,32	4,49	$z {}^{5}D^{\circ} - e {}^{5}F$	$\begin{array}{c} 4-4 \\ 1-2 \end{array}$
5706,85	5	$\{ \begin{array}{c} 3,93 \\ 3,87 \\ \end{array} \}$	$^{6,04}_{6,04}$	$y {}^{3}P^{\circ} - e {}^{3}D \ v {}^{3}D^{\circ} - e {}^{3}D$	$\begin{array}{c} 1-2 \\ 3-2 \end{array}$
5705,43	4	2,24	4,41	$a^{3}H-y^{3}H^{c}$	$\frac{3}{4} - \frac{2}{5}$
5702,666	$\hat{6}$	$\frac{2}{2}, \frac{29}{29}$	$\frac{1}{4}, \frac{1}{46}$	$z^{5}\widehat{D^{\circ}}$ $-e^{5}\widehat{F}$	1-2
5702,11	6	2,48	4,65	z $^3D^{\circ}$ — e 3F	2-2
		1 3,87	6,04	$v \stackrel{\circ}{^{3}D} \stackrel{\circ}{^{-e}} \stackrel{\circ}{^{3}D}$	2-2,
5701,66	7	12.50	4,67	z 3D $^{\circ}$ — e 3F	33
5692,53	3	$\frac{2}{2},70$ $\frac{2}{30}$	4,87	$z {}^{3}G^{\circ} - f {}^{5}F$	5-4
5689,465	10	2,30	4,48	$z {}^{5}\!D^{\circ} - e {}^{5}\!F$	2-3
5687,52	4	2, 15	4,33	$a ^3D-y ^1P^\circ$	1-0
5683,80	3	3,18	5,36	$y {}^{3}D^{\circ} - g {}^{5}F$	3-4
5681,08	6	3,30	5,49	$y {}^{5}G^{\circ} - \dot{f} {}^{5}D$	4-3
5675,413	9	2,31	4,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 2-2
5673,45	10	3,11 3,13	5,30 5,31	$y {}^{3}F^{\circ} - e {}^{5}P$	3-3
5669,76	5	3,87	6,04	$v^{9} D^{\circ} - e^{3}D$	2-2
0000,10	,	3,87	6,06	$v \stackrel{\circ}{^3D} \stackrel{\circ}{-e} \stackrel{\circ}{^3D}$	3-3
5662,891	4	2,48	4,67	z $^3D^{\circ}$ — e 3F	2-3
5662,154	$1\overline{2}$	$\frac{2}{2}, 32$	4,51	$z \stackrel{5}{=} D^{\circ} - e \stackrel{5}{=} F$	4-5
5659,104	3	0,90	3,09	a ^1D-z $^3S^{\circ}$	2-1
5656,51	4	$^{2},70$	4,89	$z^{3}G^{\circ}-f^{5}F$	5—5
5656,09	4	3,87	6,06	v 3D $^{\circ}$ $-h$ 5D	1-1
5654,78	8	2,66	4,85	$z {}^{3}G^{\circ} - f {}^{5}F$	3-2
5648,570	5	2,50	4,69	$z {}^{3}D^{\circ} - e {}^{3}F$	3-4
5644,137	18	2,27	4,46	$b {}^{1}G - y {}^{1}G^{\circ}$	44 12
5638,52	$\frac{12}{3}$	$^{3,87}_{3,57}$	6,06 $5,77$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 4—4
5634,73	$\frac{3}{c}$	3,57	5 , 77	$y \circ F = h \circ F$ $z \circ S \circ = e \circ P$	2—3
5630,29	6	$\frac{3,11}{3,94}$	5,31 6,15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 2—2
5627,45	3	$\left\{ egin{array}{l} 3,32 \\ 3,32 \end{array} \right.$	5,53	$x^{3}F^{\circ}-e^{1}D$	$\bar{2}$ — $\bar{2}$
renn ro	E	1,74	3,94	$a^{5}P-y^{3}P^{\circ}$	2-2
5623,58	5	12,58	4,78	a 1H — z 3I $^\circ$	55
5618,32	5	1,50	3,71	$a {}^{1}G$ — $w {}^{3}D^{\circ}$	4 — 3
5597,69	3			_	-

λ, Å	I	E _H , eV	EB, eV	Transition	J
5565,478	9	2,24	4,46	$a\ ^{3}H-y\ ^{1}G^{\circ}$ $b\ ^{3}F-w\ ^{3}D^{\circ}$ $b\ ^{3}F-w\ ^{3}D^{\circ}$ $b\ ^{3}F-w\ ^{3}D^{\circ}$ $a\ ^{1}H-x\ ^{1}G^{\circ}$	4-4
5514,536	25	1,44	3,69		3-2
5514,350	20	1,43	3,68		2-1
5512,529	25	1,46	3,71		4-3
5503,897	8	2,58	4,83		5-4
5490,151	12	1,46	3,72	$\begin{array}{c} b \ ^{3}F - x \ ^{5}D^{\circ} \\ z \ ^{3}F \ ^{5} - e \ ^{3}F \\ b \ ^{3}F - w \ ^{3}D^{\circ} \\ z \ ^{3}F \ ^{5} - e \ ^{3}F \\ z \ ^{3}F - e \ ^{3}F \end{array}$	4—3
5488,210	5	2,40	4,65		2—2
5481,862	5	1,43	3,69		2—2
5481,426	6	2,41	4,67		3—3
5477,695	8	2,43	4,69		4—4
5474,228	6	1,46	3,72	$b \ ^{3}F - x \ ^{3}G^{\circ}$ $b \ ^{3}F - w \ ^{3}D^{\circ}$ $a \ ^{3}F - z \ ^{5}D^{\circ}$ $b \ ^{3}F - x \ ^{3}G^{\circ}$ $c \ ^{3}P - w \ ^{3}P^{\circ}$	4—5
5471,198	5	1,44	3,71		3—3
5460,502	4	0,05	2,32		4—4
5453,646	3	1,44	3,72		3—4
5429,139	6	2,34	4,63		2—2
5426,256 5409,609 5397,093 5389,996 5369,65	3 6 4 3 4	0,02 1,89 1,88 1,87	2,31 4,18 4,18 4,17 —	a ³ F—z ⁵ D° a ³ G—w ³ F° a ³ G—w ³ F° a ³ G—w ³ F°	3—3 5—4 4—3 3—2 —
5351,072	4	2,78	5,09	$z {}^{1}F^{\circ} - e {}^{1}F$ $b {}^{1}D - x {}^{1}P^{\circ}$ $a {}^{3}G - v {}^{3}F^{\circ}$ $a {}^{3}P - x {}^{3}D^{\circ}$ $a {}^{3}G - v {}^{3}F^{\circ}$	3-3
5298,429	4	2,51	4,84		2-1
5297,236	6	1,87	4,21		3-2
5295,781	4	1,07	3,41		2-3
5283,441	8	1,88	4,22		4-3
5282,378	3	1,05	3,40	$a {}^{3}P - x {}^{3}D^{\circ}$ $a {}^{3}G - v {}^{3}F^{\circ}$ $z {}^{5}F^{\circ} - e {}^{5}F$ $z {}^{1}D^{\circ} - e {}^{1}F$ $z {}^{5}F^{\circ} - e {}^{5}F$	1-2
5265,967	10	1,89	4,24		5-4
5263,483	3	2,13	4,49		5-4
5259,976	3	2,74	5,09		2-3
5255,811	5	2,12	4,48		4-3
5252,105 5247,293 5246,574 5238,560 5224,928	8 5 3 6 8	$\begin{array}{c} 0,05 \\ 2,10 \\ 0,84 \\ \{ \begin{array}{c} 0,85 \\ 2,09 \\ 2,12 \end{array} \end{array}$	2,41 4,46 3,20 3,21 4,46 4,49	$a \ ^{3}F - z \ ^{3}F^{\circ}$ $z \ ^{5}F - e \ ^{5}F$ $a \ ^{5}F - y \ ^{5}D^{\circ}$ $a \ ^{5}F - y \ ^{5}D^{\circ}$ $z \ ^{5}F^{\circ} - e \ ^{5}F$ $z \ ^{5}F^{\circ} - e \ ^{5}F$	4-3 3-2 4-3 5-4 2-1 4-4
5224,558	6	2,10	4,48	z ⁵ F -e ⁵ F	$ \begin{array}{r} 3-3 \\ 5-5 \\ 2-2 \\ 4-4 \\ 3-2 \end{array} $
5224,301	15	2,13	4,51	z ⁵ F -e ⁵ F	
5223,623	6	2,09	4,46	z ⁵ F -e ⁵ F	
5222,685	6	2,08	4,46	z ⁵ F -e ⁵ F	
5219,697	8	0,02	2,40	a ³ F -z ³ F°	
5212,371 5210,386 5207,852 5206,059 5201,096	$\begin{array}{c} 3 \\ 40 \\ 3 \\ 5 \\ 4 \end{array}$	2,25 0,05 2,08 2,49 2,09	4,63 2,43 4,46 4,87 4,48	$b\ ^{3}P-w\ ^{3}P^{\circ}\ a\ ^{3}F-z\ ^{3}F^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}F\ a\ ^{1}P-w\ ^{1}D^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}F$	$ \begin{array}{r} 2-2 \\ 4-4 \\ 1-2 \\ 1-2 \\ 2-3 \end{array} $
5194,043	4	2,10	4,49	z ⁵ F°—e ⁵ F	3-4
5192,971	35	0,02	2,41	a ³ F—z ³ F°	3-3
5186,329	3	2,12	4,51	z ⁵ F°—e ⁵ F	4-5
5173,742	30	0,00	2,40	a ³ F—z ³ F°	2-2
5152,185	10	0,02	2,43	a ³ F—z ³ F°	3-4
5147,483	10	0,00	2,41	$a {}^{3}F - z {}^{3}F^{\circ}$	2—3
5145,465	12	1,46	3,87	$b {}^{3}F - v {}^{3}D^{\circ}$	4—3
5120,430	12	2,58	5,00	$a {}^{1}H - z {}^{1}I^{\circ}$	5—6
5113,448	10	1,44	3,87	$b {}^{3}F - v {}^{3}D^{\circ}$	3—2
5109,427	4	1,44	3,87	$b {}^{3}F - v {}^{3}D^{\circ}$	3—3
5087,055 5085,333	8 4	1,43 1,43	3,87 3,87	$b \ {}^{3}F - v \ {}^{3}D^{\circ} \\ b \ {}^{3}F - v \ {}^{3}D^{\circ}$	$\begin{array}{c} 2-1 \\ 2-2 \end{array}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
		1 -			
5071 ,475 5069 ,351 5068 ,332	7 5 3	$^{1,46}_{2,15}_{2,66}$	3,90 4,60 5,11	$b\ ^3F - w\ ^3G^{\circ} \ a\ ^3D - w\ ^3P^{\circ} \ z\ ^3G^{\circ} - e\ ^3G$	4-4 1-0 3-3
5065,985 5064,654	$\begin{array}{c} 7 \\ 25 \end{array}$	$\begin{array}{c} 1,44 \\ 0,05 \end{array}$	3,89 2,50	$b {}^{3}F - w {}^{3}G^{\circ}$ $a {}^{3}F - z {}^{3}D^{\circ}$	3—3 4—3
5064,068 5062,112 5054,070	4 7 3	$\begin{array}{c} 2,70 \\ 2,16 \\ 2,68 \end{array}$	5 ,14 4 ,61 5 ,13	$z\ {}^3G^{\circ}{-}e\ {}^3G\ a\ {}^3D{-}w\ {}^3P\ {}^{\circ}\ z\ {}^3G^{\circ}{-}e\ {}^3G$	5—5 2—1 4—4
5052,879	8	$\begin{cases} 2,68 \\ 1,88 \end{cases}$ $2,17$	4,33 4,63	$a {}^{1}S - y {}^{1}P^{\circ}$ $a {}^{3}D - w {}^{3}P^{\circ}$	0-1 3-2 5-4
5045,400 5043,578 5040,642	5 7 6	$0,85 \ 0,84 \ 0,83$	3,30 3,29 3,28	$a \ ^{5}F - y \ ^{5}G^{\circ}$ $a \ ^{5}F - y \ ^{5}G^{\circ}$ $a \ ^{5}F - y \ ^{5}G^{\circ}$	4—3 3—2
5039,959 5038,400	22 25	0,02	2,48 3,89	$a \ {}^{3}F - z \ {}^{3}D^{\circ}$ $b \ {}^{3}F - w \ {}^{3}G^{\circ}$	3—2 2—3
5036,468 5035,908 5025,570	25 25 18	1,44 1,46 2,04	3,90 3,92 4,51	$b\ ^3F-w\ ^3G^{\circ}\ b\ ^3F-w\ ^3G^{\circ}\ z\ ^5G^{\circ}-e\ ^5F$	3—4 4—5 6—5
5024,842 5022,871	20 25	0,82 0,83	3,28 $3,29$	$a \ ^{5}F - y \ ^{5}G^{\circ}$ $a \ ^{5}F - y \ ^{5}G^{\circ}$	2—2 3—3
5020,028 5016,162 5014,277	25 20 25	0,84 0,85 0,81	3,30 3,32 3,28	a ⁵ F—y ⁵ G° a ⁵ F—y ⁵ G° a ⁵ F—y ⁵ G°	4-4 5-5 1-2
5014,185 5013,284	25 18	0,00 $2,02$	2,47 4,49	$a \ ^3F - z \ ^3D^{\circ}$ $z \ ^5G^{\circ} - e \ ^5F$	2—1 5—4 3—3
5009,652 5007,209 5000,991	7 40 10	$0,02 \\ 0,82 \\ 2,00$	2,50 3,29 4,48	$a\ {}^{3}F-z\ {}^{3}D^{\circ}$ $a\ {}^{5}F-y\ {}^{5}G^{\circ}$ $z\ {}^{5}G^{\circ}-e\ {}^{5}F$	2—3 4—3
4999,504 4997,099	45 8 50	0,83 0,00 0,84	3,30 $2,48$ $3,32$	$a \ ^{5}F-y \ ^{5}G^{\circ} \ a \ ^{3}F-z \ ^{3}D^{\circ} \ a \ ^{5}F-y \ ^{5}G^{\circ}$	3-4 2-2 4-5
4991,067 4989,140 4981,732	10 60	1,98 0,85	$^{4,46}_{3,34}$	$z^{5}G^{\circ}-e^{5}F$ $a^{5}F-y^{5}G^{\circ}$ $z^{5}G^{\circ}-e^{5}F$	3—2 5—6 2—1
4978 ,191 4977 ,731 4975 ,344	10 5 10	1,97 2,02 2,51	4,46 4,51 5,00	$z {}^{5}G^{\circ} - e {}^{5}F \ b {}^{1}D - w {}^{1}F^{\sigma}$	5-5 2-3
4973,051 4968,566 4964,713	6 6 5	2,00 1,98 1,97	4,49 4,48 4,46	$z\ ^{5}G^{\circ}-e\ ^{5}F \ z\ ^{5}G^{\circ}-e\ ^{5}F \ z\ ^{5}G^{\circ}-e\ ^{5}F$	$\begin{array}{c} 4-4 \\ 3-3 \\ 2-2 \end{array}$
4948 ,183 4941 ,562	$\frac{3}{3}$	$2,17 \\ 2,16$	$^{4,68}_{4,67}$	a ³ D—u ³ F° a ³ D—u ³ F°	3—3 2—2
4938 ,283 4937 ,719 4928 ,342	$\begin{matrix} 8\\4\\12\end{matrix}$	2,58 0,81 2,15	5,09 3,32 4,67	$a\ ^{1}H-y\ ^{1}H^{\circ}\ a\ ^{5}F-x\ ^{3}F^{\circ}\ a\ ^{3}D-u\ ^{3}F^{\circ}$	5-5 1-2 1-2
4926,148 4925,396	4 5	0,82 1,88	3,33 4,40	$a \ ^{5}F - x \ ^{3}F^{\circ}$ $a \ ^{3}G - y \ ^{3}H^{\circ}$	2-3 4-4 3-4
4921,768 4919,867 4915,236	12 12 5	2,17 2,16 1,89	4,69 4,68 4,41	a ³ D—u ³ F° a ³ D—u ³ F° a ³ G—y ³ H°	2—3 5—5
4913,616 4899,910	20 20	1,87 1,88	4,40 4,41 4,42	${a\atop a}{^{3}G-y}{^{3}H}^{\circ} \ {a\atop ^{3}G-y}{^{3}H}^{\circ} \ {a\atop ^{3}G-y}{^{3}H}^{\circ} \ {a\atop ^{3}G-y}{^{3}H}^{\circ}$	3-4 4-5 5-6
4885,082 4880,922 4870,129	20 3 20	1,89 2,15 2,25	$^{4,69}_{4,79}$	$a \ ^{3}D - u \ ^{3}D^{\circ}$ $a \ ^{3}H - z \ ^{3}I^{\circ}$ $a \ ^{3}H - z \ ^{3}I^{\circ}$	1—1 5—6 4—5
4868,264 4864,187 4856,012	18 4 20	2,24 2,16 2,26	4,78 4,71 4,81	$a \ ^{3}D - u \ ^{3}D^{\circ} \ a \ ^{3}H - z \ ^{3}I^{\circ}$	$\begin{array}{c} 2-2 \\ 6-7 \end{array}$
4848,487 4840,874	$\begin{array}{c} 8 \\ 25 \end{array}$	2,17 0,90	$\frac{4,73}{3,46}$	a ³ D—u ³ D° a ¹ D—y ¹ D°	3—3 2—2

λ, Å	I	$E_{ m H}^{},{ m eV}$	$E_{\rm B}$, eV	Transition	J
4836,125 4825,445 4820,410 4812,240 4811,074	$\begin{array}{c} 6 \\ 3 \\ 20 \\ 5 \\ 4 \end{array}$	2,27 2,32 1,50 2,34 1,89	4,83 4,89 4,07 4,92 4,46	$b {}^{1}G - x {}^{1}G^{\circ}$ $z {}^{5}D^{\circ} - f {}^{5}F$ $a {}^{1}G - y {}^{1}F^{\circ}$ $c {}^{3}P - s {}^{3}D^{\circ}$ $a {}^{3}G - y {}^{1}G^{\circ}$	4—4 4—5 4—3 2—2 5—4
4808,531 4805,416 4799,797 4797,983 4796,210	5 12 12 5 6	3,06 2,34 2,27 2,33 2,33	5,64 4,92 4,85 4,92 4,92	$z {}^{1}G^{\circ} - e {}^{1}II$ $c {}^{3}P - s {}^{3}D^{\circ}$ $b {}^{1}G - x {}^{3}H^{\circ}$ $c {}^{3}P - s {}^{3}D^{\circ}$ $c {}^{3}P - s {}^{3}D^{\circ}$	4—5 2—3 4—4 1—1 0—1
4792,482 4781,718 4778,259 4771,103 4769,775	10 6 10 3 4	2,33 0,85 2,24 0,83 2,26	4,92 3,44 4,83 3,42 4,85	c ³ P-s ³ D° a ⁵ F-y ³ G° a ³ H-x ¹ G° a ⁵ F-y ³ G° a ³ H-x ³ H°	1—2 5—5 4—4 3—4 6—5
4766,330 4759,272 4758,913 4758,120 4747,680	$\begin{array}{c} 4 \\ 25 \\ 4 \\ 25 \\ 3 \end{array}$	2,25 2,26 0,84 2,25 2,25	4,85 4,86 3,44 4,85 4,86	$a\ ^{3}H-x\ ^{3}H^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}\ a\ ^{5}F-y\ ^{3}G^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}$	5—4 6—6 4—5 5—5 5—6
4742,791 4742,129 4734,682 4733,426 4731,172	20 3 3 6 9	2,24 2,15 2,24 2,16 2,17	4,85 4,77 4,85 4,78 4,79	$a\ ^{3}H-x\ ^{3}H^{\circ}$ $a\ ^{3}D-t\ ^{3}F^{\circ}$ $a\ ^{3}H-x\ ^{3}H^{\circ}$ $a\ ^{3}D-t\ ^{3}F^{\circ}$ $a\ ^{3}D-t\ ^{3}F^{\circ}$	4—4 1—2 4—5 2—3 3—4
4723,171 4722,603 4715,295 4710,186 4698,86	10 10 4 18 6	$ \begin{array}{c} 1,07 \\ 1,05 \\ 0,05 \\ 1,05 \\ 2,17 \\ 2,16 \end{array} $	3,69 3,68 2,68 3,68 4,81 4,80	$a\ ^{3}P-w\ ^{3}D^{\circ}\ a\ ^{3}P-w\ ^{3}D^{\circ}\ a\ ^{3}F-z\ ^{3}G^{\circ}\ a\ ^{3}P-w\ ^{3}D^{\circ}\ a\ ^{3}D-t\ ^{3}D^{\circ}\ a\ ^{3}D-t\ ^{3}D^{\circ}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 4-4 \\ 0-1 \\ 3-3 \\ 2-2 \end{array} $
4698,766 4696,923 4693,670 4691,336 4690,827	20 4 5 20 3	1,05 2,15 0,02 1,07 1,07	3,69 4,79 2,66 3,71 3,71	$a \ ^{3}P - w \ ^{3}D^{\circ}$ $a \ ^{3}D - t \ ^{3}D^{\circ}$ $a \ ^{3}F - z \ ^{3}G^{\circ}$ $a \ ^{3}P - w \ ^{3}D^{\circ}$ $a \ ^{3}P - x \ ^{3}G^{\circ}$	1-2 1-1 3-3 2-3 2-3
4688,392 4686,921 4681,908 4675,118 4667,585	3 4 30 10 25	3,09 2,15 0,05 1,07 0,02	5,73 4,80 2,70 3,72 2,68	$z {}^{3}S^{\circ} - e {}^{3}P$ $a {}^{3}D - t {}^{3}D^{\circ}$ $a {}^{3}F - z {}^{3}G^{\circ}$ $a {}^{3}F - x {}^{5}D^{\circ}$ $a {}^{3}F - z {}^{3}G^{\circ}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 4-5 \\ 2-3 \\ 3-4 \end{array} $
4656,468 4656,048 4655,712 4650,016 4645,193	$25 \\ 6 \\ 3 \\ 10 \\ 12$	0,00 1,75 2,34 1,74 1,73	2,66 4,41 5,01 4,40 4,40	$a\ ^{3}F-z\ ^{3}G^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ c\ ^{3}P-v\ ^{3}P^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}$	2-3 3-2 2-1 2-1 1-0
4639,944 4639,669 4639,369 4637,887 4635,539	15 15 18 8 3	1,73 1,75 1,74 2,34 2,33	4,40 4,42 4,41 5,02 5,01	$a\ ^{5}P-w\ ^{5}D^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ c\ ^{3}P-v\ ^{3}P^{\circ}\ c\ ^{3}P-v\ ^{3}P^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 3 \\ 2 - 2 \\ 2 - 2 \\ 0 - 1 \end{array} $
4629,336 4623,098 4619,525 4617,269 4599,23	15 25 3 30 5	1,73 1,74 2,33 1,75	4,41 4,42 5,02 4,43	$a\ ^{5}P-w\ ^{5}D^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ c\ ^{3}P-v\ ^{3}P^{\circ}\ a\ ^{5}P-w\ ^{5}D^{\circ}\ -$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-2 \\ 3-4 \\ \end{array} $
4570,906 4563,427 424	3 5	2,40 2,43	5,11 5,14	z ³ F°—e ³ G z ³ F°—e ³ G	2—3 4—5

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
4562,637	6	0,02	2,74	$a\ {}^{3}F-z\ {}^{1}D^{\circ} \\ b\ {}^{3}F-w\ {}^{3}F^{\circ} \\ a\ {}^{5}F-y\ {}^{5}F^{\circ}$	3-2
4559,920	6	1,46	4,18		4-4
4555,486	30	0,85	3,57		5-4
4555,069	3	2,41	5,43	$z\ {}^{3}F^{\circ}-e\ {}^{3}G$ $a\ {}^{5}F-y\ {}^{5}F^{\circ}$ $a\ {}^{5}F-y\ {}^{5}F^{\circ}$ $a\ {}^{5}F-y\ {}^{5}F^{\circ}$ $a\ {}^{5}F-y\ {}^{5}F^{\circ}$	3-4
4552,453	35	0,84	3,56		4-3
4548,764	35	0,83	3,55		3-2
4544,688	30	0,82	3,55		2-1
4536,051	40	0,81	3,55		1-1
4535,920	40	0,82	3,55	a ⁵ F-y ⁵ F°	2—2
4535,574	50	0,83	3,56	a ⁵ F-y ⁵ F°	3—3
4534,782	60	0,84	3,57	a ⁵ F-y ⁵ F°	4—4
4533,238	80	0,85	3,58	a ⁵ F-y ⁵ F°	5—5
4527,455	4	0,02	2,74	a ³ F-z ¹ D°	2—2
4527,305	35	0,81	3,55	a ⁵ F-y ⁵ F°	$ \begin{array}{r} 4-2 \\ 2-3 \\ 2-2 \\ 3-4 \\ 4-5 \end{array} $
4522,798	40	0,82	3,56	a ⁵ F-y ⁵ F°	
4518,700	8	1,43	4,17	b ³ F-w ³ F°	
4518,022	50	0,83	3,57	a ⁵ F-y ⁵ F°	
4512,734	40	0,84	3,58	a ⁵ F-y ⁵ F°	
4503,762 4497,709 4496,146 4492,540 4489,089	$\begin{array}{c} 4 \\ 3 \\ 20 \\ 3 \\ 20 \end{array}$	2,13 2,12 1,75 2,10 1,74	4,89 4,87 4,51 4,86 4,50	$z {}^{5}F^{\circ} - f {}^{5}F$ $z {}^{5}F^{\circ} - f {}^{5}F$ $a {}^{5}P - y {}^{5}P^{\circ}$ $z {}^{5}F^{\circ} - f {}^{5}F$ $a {}^{5}P - y {}^{5}P^{\circ}$	5—5 4—4 3—2 3—3 2—1
4482,688 4481,261 4480,600 4479,724 4474,852	10 30 5 9	$1,46 \\ 1,75 \\ 1,74 \\ 1,73 \\ 1,44 \\ 2,10$	4,22 4,51 4,51 4,50 4,21 4,87	$b\ ^3F - v\ ^3F^\circ \ a\ ^5P - y\ ^5P^\circ \ a\ ^5P - y\ ^5P^\circ \ a\ ^5P - y\ ^5F^\circ \ b\ ^3F - v\ ^3F^\circ \ z\ ^5F^\circ - f\ ^5F$	4-3 3-3 2-2 1-1 3-2 3-4
4471,238	20	1,73	4,51	a ⁵ P-y ⁵ P°	1-2
4465,807	20	1,74	4,51	a ⁵ P-y ⁵ P°	2-3
4463,539	8	1,89	4,66	a ³ G-v ³ G°	5-4
4463,391	8	1,88	4,66	a ³ G-v ³ G°	4-3
4462,089	3	0,00	2,78	a ³ F-z ¹ F°	2-3
4457,428	40	1,46	4,24	$b\ ^{3}F-v\ ^{3}F^{\circ}\ b\ ^{3}F-v\ ^{3}F^{\circ}\ a\ ^{3}G-v\ ^{3}F^{\circ}\ b\ ^{3}F-v\ ^{3}F^{\circ}\ a\ ^{3}G-v\ ^{3}G^{\circ}$	4-4
4455,321	30	1,44	4,22		3-3
4453,708	20	1,87	4,66		3-3
4453,312	30	1,43	4,21		2-2
4450,896	25	1,88	4,66		4-4
4449,143	30	1,89	4,67	$a \ ^{3}G - v \ ^{3}G^{\circ}$ $z \ ^{1}D^{\circ} - e \ ^{1}D$ $a \ ^{3}G - v \ ^{3}G^{\circ}$ $a \ ^{3}G - x \ ^{1}F^{\circ}$ $a \ ^{3}G - v \ ^{3}G^{\circ}$	5-5
4443,20	3	2,74	5,53		2-2
4441,272	4	1,87	4,66		3-4
4440,345	10	1,87	4,66		3-3
4436,586	4	1,88	4,67		4-5
4434,003 4433,578 4431,284 4430,366 4430,023	15 3 4 7 3	{ 1,43 1,87 2,40 2,23 1,44 2,41	4,22 4,67 5,19 5,03 4,24 5,21	$\begin{array}{c} b \ ^{3}F - v \ ^{3}F^{\circ} \\ a \ ^{3}G - u \ ^{3}F^{\circ} \\ z \ ^{3}F^{\circ} - g \ ^{3}F \\ b \ ^{3}P - r \ ^{3}D^{\circ} \\ b \ ^{3}F - v \ ^{3}F^{\circ} \\ z \ ^{3}F^{\circ} - g \ ^{3}F \end{array}$	2-3 3-2 2-2 0-1 3-4 3-3
4427,098 4426,054 4425,840 4422,823 4421,754	40 10 3 10 6	1,50 1,88 1,07 1,07 2,24	4,30 4,68 3,87 3,87 5,04	$a {}^{1}G-z {}^{1}H^{\circ}$ $a {}^{3}G-u {}^{3}F^{\circ}$ $a {}^{3}P-v {}^{3}D^{\circ}$ $a {}^{3}P-v {}^{3}D^{\circ}$ $b {}^{3}P-r {}^{3}D^{\circ}$ $a {}^{3}G-u {}^{3}F^{\circ}$	4-5 4-3 2-2 2-3 1-2 5-4
4417,274 4416,535 4404,911	15 4 5	1,89 1,87 1,88	4,69 4,68 4,69	a ³ G—u ³ F° a ³ G—u ³ F°	3—3 3—3 4—4

λ. Å	I	E _H , eV	E _B , eV	Transition	J
4404,397	5	1,05	3 ,87	<i>a</i> ³ <i>P</i> − <i>v</i> ³ <i>D</i> °	1—2
4404,276	10	$\left\{ \begin{array}{l} 2,25 \\ 2,25 \end{array} \right.$	5,06 5,06	b 3P-x 3S° b 3P-r 3D°	$ \begin{array}{c} 2-1 \\ 2-3 \end{array} $
4393,925 4388,077	8 3	$^{2,27}_{2,24}$	$5,09 \\ 5,06$	$b {}^{1}G - y {}^{1}H^{\circ} \\ b {}^{3}P - x {}^{3}S^{\circ}$	4—5 1—1
4372,383 4369,682	3 5	2,49 $2,58$	5,32 5,41	$a {}^{1}P - w {}^{1}P {}^{\circ}$ $a {}^{1}H - v {}^{1}G {}^{\circ}$	1—1 5—4
4360,487	4	2,17	5,02	$a~^3D-v~^3P^{\circ}$	3—2
4354,064 4346,104	3 5	2,16 2,24	5 ,01 5 ,09	$a \ ^{3}D - v \ ^{3}P^{\circ}$ $a \ ^{3}H - y \ ^{1}H^{\circ}$	$\begin{array}{c} 2 - 1 \\ 4 - 5 \end{array}$
4326, 359 4325, 134	9 9	$^{0,83}_{2,25}$	3,69 $5,11$	$a {}^{5}F - w {}^{3}D^{\circ}$ $a {}^{3}H - u {}^{3}G^{\circ}$	$\begin{array}{c} 3-2 \\ 5-4 \end{array}$
4321 ,655 4318 ,631	8 10	$2,24 \\ 2,26$	5,10 5,13	$a \ ^{3}H-u \ ^{3}G^{\circ} \ a \ ^{3}H-u \ ^{3}G^{\circ}$	4—3 6—5
4314,801 4314,74	25 25	$0,84 \\ 0,82$	$3,71 \\ 3,69$	$a \stackrel{5}{}_{5F-w} \stackrel{3}{}_{3D}$ ° $a \stackrel{5}{}_{5F-w} \stackrel{3}{}_{3D}$ °	$\begin{array}{c} 3 \\ 4-3 \\ 2-2 \end{array}$
4314,356 4305,910	5 60	$0,84 \\ 0,85$	$3,71 \\ 3,73$	$a {}^{5}F - x {}^{3}G^{\circ}$ $a {}^{5}F - x {}^{5}D^{\circ}$	4—3 5—4
4301,089	50	0,84	3,72	a 5F — x 5D ${}^\circ$	4—3
4300,566 4299,636	50 15	$^{0,83}_{0,83}$	3,71 3,71	$a {}^{5}F - x {}^{5}D^{\circ}$ $a {}^{5}F - w {}^{3}D^{\circ}$	$\begin{array}{c} 3-2 \\ 3-3 \\ \end{array}$
4299 ,229 4298 ,664	$\begin{array}{c} 15 \\ 40 \end{array}$	$^{1}_{0},\!75$ $^{0}_{0},\!82$	4,63 3, 7 0	${a\atop a} {}^{5}P - y {}^{5}S^{\circ} \ {a\atop 5}F - x {}^{5}D^{\circ}$	$\begin{array}{c} 3-2 \\ 2-1 \end{array}$
4295,751	22	0,81 $1,74$	3,70 4,63	$a {}^{5}F - x {}^{5}D^{\circ} \ a {}^{5}P - w {}^{3}P^{\circ}$	$\begin{array}{c} 1 - 0 \\ 2 - 2 \end{array}$
4291,214 4290,933	$5\\22$	$ \begin{cases} 1,74 \\ 0,84 \\ 0,81 \end{cases} $	$\frac{3}{3},72$ $\frac{3}{7},70$	$a ilde{^5}F - x ilde{^3}G^{\circ}$ $a ilde{^5}F - x ilde{^5}D^{\circ}$	$\begin{array}{c} 2 - 2 \\ 4 - 5 \\ 1 - 1 \end{array}$
4289,919 4289,068	$\begin{array}{c} -3 \\ 25 \end{array}$	$2,17 \\ 0,82$	5,06 3,71	$ \begin{array}{c} \stackrel{\circ}{a} \stackrel{\circ}{3} D - r \stackrel{\circ}{3} D \stackrel{\circ}{\circ} \\ \stackrel{\circ}{a} \stackrel{\circ}{5} F - x \stackrel{\circ}{5} D \stackrel{\circ}{\circ} \end{array} $	$\begin{array}{c} 3 - 3 \\ 2 - 2 \end{array}$
4288,161	3	$\left\{ \begin{array}{l} 1,05 \\ 0,82 \end{array} \right.$	3,94	a ³P−y ³P°	1—2
4287,405 4286,006	22 25	0,84	$3,71 \\ 3,73 \\ 2,79$	$a \ {}^{5}F - w \ {}^{3}D^{\circ}$ $a \ {}^{5}F - x \ {}^{5}D^{\circ}$	2—3 4—4
4284,988 4282,702	8 12	0,83 1,74 1,87	3,72 4,63 4,77	$a\ ^{5}F$ — $x\ ^{5}D^{\circ}$ $a\ ^{5}P$ — $y\ ^{5}S^{\circ}$ $a\ ^{3}G$ — $t\ ^{3}F^{\circ}$	$\begin{array}{c} 3-3 \\ 2-2 \\ 3 \end{array}$
4281,371	10	0,81	4,77 3,71	a 5F — x 5D ${}^\circ$	3—2 1—2
4278,829 4278,231	3 7	$\substack{2,31\\2,58}$	5,20 5,48	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2 5-5
4276 ,441 4274 ,584	8 15	1,73 1,88	$^{4,63}_{4,78}$	a ⁵ P-y ⁵ S° a ³ G-t ³ F°	$\begin{array}{c} 1-2 \\ 4-3 \end{array}$
4272,440	8	0,82	$\substack{3,72\\3,73}$	$a \ ^5F$ — $x \ ^5D^\circ$ $a \ ^5F$ — $x \ ^5D^\circ$	2—3 3—4
$4270,139 \\ 4266,227$	$\frac{7}{3}$	$\frac{2}{32}$, $\frac{32}{2}$, $\frac{30}{30}$	$\frac{5,22}{5,20}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4—4 2—2
4265,723 $4265,273$	4 3	$\frac{1,87}{2,29}$	4,78 5,19	$a \ {}^{3}G - t \ {}^{3}F^{\circ}$ $z \ {}^{5}D^{\circ} - e \ {}^{5}D$	$\frac{3}{3}$ $\frac{3}{0-1}$
4263,134 4261,609	15 5	1,89 2,31	4,79	a 3G — t 3F $^{\circ}$	5—4
4258,523 $4256,025$	3 4 8	2,29	$5,21 \\ 5,20 \\ 5,22$	$z {}^{5}D^{\circ} - e {}^{5}D$ $z {}^{5}D^{\circ} - e {}^{5}D$	3—3 1—2
4251,618	3	2,32 1,88	$\substack{5,23\\4,79}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4—4 4—4
4249,414 4237,889	5 7	2,30 2,51	$\substack{5,21\\5,43}$	$z\ ^{5}D^{\circ}\!\!\!-\!e\ ^{5}D \\ b\ ^{1}D\!\!\!\!-\!\!u\ ^{1}D^{\circ}$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$
4227 ,654 4224 ,795	5 5	$\begin{smallmatrix}2,49\\2,78\end{smallmatrix}$	$\substack{5,42\\5,71}$	$a \stackrel{1}{P} - v \stackrel{1}{D} \circ z \stackrel{1}{F} \circ - e \stackrel{1}{G}$	$\begin{array}{c} -2 \\ 3-4 \end{array}$
4211,729	4	2,49	5,43	$a {}^{1}P$ — $u {}^{1}D$ °	1—2
4203,465 4200,752	8 6	$\begin{array}{c} 2,25 \\ 2,25 \\ 2,25 \end{array}$	5,20 $5,20$	$b {}^{3}P - u {}^{3}P \circ \\ b {}^{3}P - u {}^{3}P \circ \\ a {}^{3}P \circ $	$\begin{array}{c} 2-2 \\ 2-1 \end{array}$
4188,694 426	5	2,24	5,20	b ³P—u ³P°	1—2

λ, Å	I	$E_{ m H}^{},\;{ m eV}$	E _B , eV	Transition	J
4186,119 4183,294	$\begin{array}{c} 25 \\ 4 \end{array}$	1,50 2,24	4,46 5,20	$a {}^{1}G - y {}^{1}G^{\circ} \\ b {}^{3}P - u {}^{3}P^{\circ}$	4—4 1—0
4180,86 4174,472 4171,018 4169,330 4166,311	3 8 7 6	1,88 2,23 2,15 1,89 1,88	4,84 5,20 5,12 4,86 4,85	$a\ {}^{1}S - x\ {}^{1}P^{\circ} \\ b\ {}^{3}P - u\ {}^{3}P^{\circ} \\ a\ {}^{3}D - s\ {}^{3}F^{\circ} \\ a\ {}^{3}G - x\ {}^{3}H^{\circ} \\ a\ {}^{3}G - x\ {}^{3}H^{\circ}$	0-1 $0-1$ $1-2$ $5-6$ $4-5$
4164,134	4	1,87	4,85	$a\ {}^{3}G-x\ {}^{3}H^{\circ}$ $a\ {}^{3}D-s\ {}^{3}F^{\circ}$ $a\ {}^{3}D-s\ {}^{3}F^{\circ}$ $z\ {}^{5}D^{\circ}-e\ {}^{5}P$ $z\ {}^{5}D^{\circ}-e\ {}^{5}P$	3-4
4159,634	9	2,16	5,14		2-3
4150,963	10	2,17	5,16		3-4
4150,557	3	2,30	5,28		2-1
4143,280	3	2,29	5,28		1-1
4143,048 4137,284 4131,244 4127,531 4123,559	7 10 4 15 10	2,31 2,32 2,30 2,70 2,68	5,30 5,31 5,30 5,70 5,68	$z {}^{5}D^{\circ} - e {}^{5}P$ $z {}^{5}D^{\circ} - e {}^{5}P$ $z {}^{5}D^{\circ} - e {}^{5}P$ $z {}^{3}G^{\circ} - f {}^{3}H$ $z {}^{3}G^{\circ} - f {}^{3}H$	$ \begin{array}{r} 3-2 \\ 4-3 \\ 2-2 \\ 5-6 \\ 4-5 \end{array} $
4123,287	5	2,78	5,78	$z^{1}F^{\circ}-f^{1}F$ $z^{3}G^{\circ}-f^{3}H$ $a^{3}F-z^{1}G^{\circ}$ $a^{3}D-u^{3}P^{\circ}$ $a^{3}P-x^{3}P^{\circ}$	3-3
4122,143	10	2,66	5,67		3-4
4112,708	20	0,05	3,06		4-4
4099,166	8	2,17	5,20		3-2
4082,456	20	1,07	4,10		2-1
4079,708	6	2,16	5,20	$a\ ^{3}D-u\ ^{3}P^{\circ}\ a\ ^{3}P-x\ ^{3}P^{\circ}\ a\ ^{3}D-u\ ^{3}P^{\circ}\ a\ ^{3}F-z\ ^{1}G^{\circ}\ z\ ^{5}D^{\circ}-g\ ^{5}F$	2—2
4078,471	30	1,07	4,11		2—2
4077,143	4	2,16	5,20		2—1
4076,370	4	0,02	3,06		3—4
4074,356	3	2,32	5,36		4—4
4068,981	4	2,74	5,78	$z ^{1}D^{\circ} - f ^{1}F$ $a ^{3}D - u ^{3}P^{\circ}$ $a ^{3}P - x ^{3}P^{\circ}$ $a ^{3}P - x ^{3}P^{\circ}$ $a ^{3}P - x ^{3}P^{\circ}$	2-3
4068,144	3	2,15	5,20		1-1
4065,094	15	1,05	4,10		1-0
4064,203	15	1,05	4,10		1-1
4060,263	20	1,05	4,11		1-2
4058,139	7	2,32	5,37	$z {}^{5}D^{\circ} - g {}^{5}F$	4-5
4057,612	5	2,31	5,36	$z {}^{5}D^{\circ} - g {}^{5}F$	3-4
4055,011	20	1,05	4,10	$a {}^{3}P - x {}^{3}P^{\circ}$	0-1
4040,310	4	2,12	5,18	$z {}^{5}F^{\circ} - e {}^{5}G$	4-4
4035,828	10	2,17	5,25	$a {}^{3}D - q {}^{3}D^{\circ}$	3-3
4034,884	5	2,15	5,23	$a\ ^{3}D-q\ ^{3}D^{\circ} \ a\ ^{3}D-q\ ^{3}D^{\circ} \ z\ ^{3}G^{\circ}-h\ ^{3}F \ z\ ^{5}F^{\circ}-e\ ^{5}G \ z\ ^{5}F^{\circ}-e\ ^{5}G$	1-1
4033,883	6	2,16	5,23		2-2
4032,628	3	2,70	5,77		5-4
4031,753	3	2,10	5,18		3-3
4030,512	25	2,13	5,21		5-6
4026,539	25	2,12	5,20	$z {}^{5}F^{\circ} - c {}^{5}G$ $a {}^{3}F - y {}^{3}F^{\circ}$ $z {}^{5}F^{\circ} - e {}^{5}G$ $z {}^{5}F^{\circ} - e {}^{5}G$ $a {}^{3}D - q {}^{3}D^{\circ}$	4-5
4024,573	35	0,05	3,13		4-3
4021,812	25	2,10	5,18		3-4
4017,771	15	2,09	5,18		2-3
4016,943	3	2,16	5,25		2-3
4016,264	6	2,13	5,22	$z {}^{5}F^{\circ} - g {}^{3}F$ $z {}^{5}F^{\circ} - e {}^{5}G$ $z {}^{5}F^{\circ} - e {}^{5}H$ $z {}^{5}F^{\circ} - g {}^{3}F$ $a {}^{3}F - z {}^{3}S^{\circ}$	5-4
4015,377	12	2,08	5,17		1-2
4013,587	12	2,13	5,22		5-6
4012,786	3	2,12	5,21		4-3
4011,534	3	0,00	3,09		2-1
4009,653	15	0,02	3,11	$a\ ^{3}F$ — $z\ ^{5}S^{\circ}$ $a\ ^{3}F$ — $y\ ^{3}F^{\circ}$ $z\ ^{5}F^{\circ}$ — $e\ ^{5}H$ $z\ ^{5}F^{\circ}$ — $e\ ^{5}H$ $z\ ^{5}F^{\circ}$ — $e\ ^{5}D$ $z\ ^{5}F^{\circ}$ — $e\ ^{5}D$	3-2
4008,926	35	0,02	3,11		3-2
4008,046	9	2,12	5,21		4-5
4007,195	3	2,09	5,19		2-3
4005,952	6	2,10	5,20		3-4
4003,789	10	2,13	5,23		5-4
4002,466	9	2,12	5,21		4-3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3999 ,336 3998 ,635 3994 ,683	7 100 4	$\begin{array}{c} 2,10 \\ 0,05 \\ 2,10 \\ 2,09 \end{array}$	5,20 3,15 5,21 5,19	$z {}^{5}F^{\circ} - e {}^{5}D$ $a {}^{3}F - y {}^{3}F^{\circ}$ $z {}^{5}F^{\circ} - g {}^{3}F$ $z {}^{5}F^{\circ} - e {}^{5}D$	3-2 4-4 3-3 2-1
3989,758	80	0,02	3,13	$a\ ^{3}F-y\ ^{3}F^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}D\ a\ ^{3}F-z\ ^{5}S^{\circ}\ a\ ^{3}F-y\ ^{3}F^{\circ}\ a\ ^{3}F-y\ ^{3}F^{\circ}$	3—3
3984,313	3	2,10	5,21		3—3
3982,478	30	0,00	3,11		2—2
3981,761	70	0,00	3,11		2—2
3964,269	35	0,02	3,15		3—4
3962 ,851	35	0,00	3,13	a ³ F-y ³ F°	$ \begin{array}{r} 2-3 \\ 4-3 \\ 3-2 \\ 2-1 \\ 3-2 \end{array} $
3958 ,206	80	0,05	3,18	a ³ F-y ³ D°	
3956 ,336	60	0,02	3,15	a ³ F-y ³ D°	
3948 ,670	60	0,00	3,14	a ³ F-y ³ D°	
3947 ,770	40	0,02	3,16	a ³ F-z ³ P°	
3934,527	50	0,02	3,48	a ³ F-y ³ D°	$ \begin{array}{r} 3-3 \\ 4-3 \\ 2-2 \\ 5-4 \\ 3-3 \end{array} $
3934,228	9	0,05	3,20	a ³ F-y ⁵ D°	
3929,875	40	0,00	3,45	a ³ F-y ³ D°	
3926,319	10	2,58	5,73	a ¹ H-u ¹ G°	
3924,51	50	0,02	3,18	a ³ F-y ³ D°	
3921,423	30	0,00	3,16	a ³ F-z ³ P°	$ \begin{array}{r} 2-2 \\ 4-3 \\ 3-2 \\ 2-1 \\ 4-4 \end{array} $
3919,822	5	1,50	4,66	a ¹ G-x ¹ F°	
3915,879	3	0,02	3,19	a ³ F-y ⁵ D°	
3914,751	5	0,00	3,17	a ³ F-z ³ P°	
3914,334	35	0,05	3,21	a ³ F-y ⁵ D°	
3911 ,185	8	2,04	5,21	$z\ ^{5}G^{\circ}-e\ ^{5}G$ $a\ ^{1}D-y\ ^{1}F^{\circ}$ $a\ ^{3}F-y\ ^{5}D^{\circ}$ $a\ ^{3}F-y\ ^{3}D^{\circ}$ $z\ ^{5}G^{\circ}-e\ ^{5}H$	6-6
3904 ,785	40	0,90	4,07		2-3
3900 ,958	12	0,02	3,20		3-3
3898 ,487	8	0,00	3,18		2-3
3895 ,243	30	2,04	5,22		6-6
3889,948 3888,020 3882,892 3882,313 3882,147	6 4 20 10 15	0,00 2,00 2,04 2,02 2,02	3,19 5,18 5,23 5,21 5,21	$a\ ^{3}F-y\ ^{5}D^{\circ} \ z\ ^{5}G^{\circ}-e\ ^{5}G \ z\ ^{5}G^{\circ}-e\ ^{5}H \ z\ ^{5}G^{\circ}-e\ ^{5}G \ z\ ^{5}G^{\circ}-e\ $	$ \begin{array}{r} 2-2 \\ 4-4 \\ 6-7 \\ 5-5 \\ 5-6 \end{array} $
3881,399 3875,262 3873,203 3869,275 3868,397	4 20 10 5 10	0,02 { 0,00 2,00 2,00 1,97 1,98	3,21 3,20 5,20 5,20 5,17 5,18	$a\ ^{3}F-y\ ^{5}D^{\circ}\ a\ ^{3}F-y\ ^{5}D^{\circ}\ z\ ^{5}G^{\circ}-e\ ^{5}G\ z\ ^{5}G^{\circ}-e\ ^{5}$	3-4 2-3 4-5 4-4 2-2 3-4
3867,739	3	1,98	5,19	$z {}^{5}G^{\circ} - e {}^{5}H$ $z {}^{5}G^{\circ} - e {}^{5}H$ $z {}^{5}G^{\circ} - e {}^{5}G$ $z {}^{5}G^{\circ} - e {}^{5}H$ $z {}^{5}G^{\circ} - e {}^{5}H$	3-3
3866,446	15	2,02	5,22		5-6
3862,823	10	1,97	5,18		2-3
3858,133	15	2,00	5,21		4-5
3853,719	10	1,98	5,20		3-4
3853,038 3846,436 3842,61 3836,763 3833,91	10 6 3 5 3	1,97 2,13 - 1,46	5,19 5,36 - 4,69	$z {}^{5}G^{\circ} - e {}^{5}H$ $- $	2—3 — 5—4 — 4—4
3828,480	3	2,13	5,37	z ⁵ F°—g ⁵ F	5-5
3817,639	5	2,10	5,35	z ⁵ F°—g ⁵ F	3-3
3814,855	4	2,09	5,34	z ⁵ F°—g ⁵ F	2-2
3811,385	4	1,87	5,12	a ³ G—s ³ F°	3-2
3801,093	3	1,88	5,14	a ³ G—s ³ F°	4-3
3798,276	6	1,43	4,69	$b\ ^{3}F-u\ ^{3}D^{\circ} \ b\ ^{3}F-u\ ^{3}D^{\circ} \ b\ ^{3}F-u\ ^{3}D^{\circ}$	2—1
3795,903	7	1,44	4,71		3—2
3789,293	8	1,46	4,73		4—3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3786 ,253	3	1,89	5 , i 6	$a {}^{3}G - s {}^{3}F^{\circ}$ $a {}^{1}D - z {}^{1}P^{\circ}$	5—4
3786 ,043	20	0,90	4 ,17		2—1
3771,652	25	0,05	3,33	$a\ {}^{3}F-x\ {}^{3}F^{\circ}\ a\ {}^{3}P-x\ {}^{1}D^{\circ}\ a\ {}^{1}D-z\ {}^{1}P^{\circ}\ a\ {}^{3}F-x\ {}^{3}F^{\circ}\ a\ {}^{3}F-x\ {}^{3}F^{\circ}$	4-3
3766,445	3	1,05	4,34		1-2
3766,043	20	0,90	4,17		2-1
3753,623	25	0,02	3,32		3-2
3752,860	80	0,05	3,35		4-4
3748,101	6	1,87	5,18	$a\ {}^{3}G-w\ {}^{3}H^{\circ}$ $a\ {}^{3}F-x\ {}^{3}F^{\circ}$ $a\ {}^{3}G-w\ {}^{3}H^{\circ}$ $a\ {}^{3}G-w\ {}^{3}H^{\circ}$ $a\ {}^{3}F-x\ {}^{3}F^{\circ}$	3-4
3741,059	60	0,02	3,33		3-3
3738,901	5	1,88	5,19		4-5
3733,767	4	1,89	5,21		5-6
3729,806	50	0,00	3,32		2-2
3725,155	20	1,07	4,39	$a\ ^{3}P-y\ ^{3}S^{\circ}\ a\ ^{1}G-x\ ^{1}G^{\circ}\ a\ ^{3}F-x\ ^{3}F^{\circ}\ a\ ^{3}F-x\ ^{3}F^{\circ}\ a\ ^{3}P-y\ ^{3}S^{\circ}$	2—1
3724,570	20	1,50	4,83		4—4
3722,568	15	0,02	3,35		3—4
3717,393	20	0,00	3,33		2—3
3709,963	20	1,05	4,39		1—1
3708,625	4	2,43	5,77	$z {}^{3}F^{\circ} - h {}^{3}F$	4-4 $ 5-4 $ $ 4-3 $ $ 0-1 $ $ 2-2$
3707,549	10	2,02	5,36	$z {}^{5}G^{\circ} - g {}^{5}F$	
3704,295	15	1,46	4,81	$b {}^{3}F - t {}^{3}D^{\circ}$	
3702,291	10	1,05	4,39	$a {}^{3}P - y {}^{3}S^{\circ}$	
3698,183	3	2,25	5,60	$b {}^{3}P - t {}^{3}P^{\circ}$	
3694,445 3689,916 3687,354 3671,672 3668,965	10 15 5 20 15	1,44 0,05 0,05 0,05 0,05 0,02	4,80 3,41 3,41 3,42 3,40	$b\ ^{3}F-t\ ^{3}D\ ^{\circ}$ $a\ ^{3}F-x\ ^{3}D\ ^{\circ}$ $a\ ^{3}F-y\ ^{3}G\ ^{\circ}$ $a\ ^{3}F-y\ ^{3}G\ ^{\circ}$ $a\ ^{3}F-x\ ^{3}D\ ^{\circ}$	3-2 4-3 4-3 4-4 3-2
3660,631	12	0,02	3,41	$a\ {}^{3}F - x\ {}^{3}D^{\circ}$ $a\ {}^{3}F - y\ {}^{3}G^{\circ}$ $a\ {}^{3}F - x\ {}^{3}D^{\circ}$ $a\ {}^{3}F - y\ {}^{3}G^{\circ}$ $a\ {}^{3}F - y\ {}^{3}G^{\circ}$ $a\ {}^{3}F - y\ {}^{3}D^{\circ}$	3-3
3658,097	20	0,02	3,41		3-3
3654,592	15	0,00	3,39		2-1
3653,497	100	0,05	3,44		4-5
3646,198	12	0,00	3,40		2-2
3642,675 3637,966 3635,462 3635,202 3633,458	80 10 80 8 5	0,02 0,00 0,00 0,05	3,42 3,41 3,41 3,46	$a\ {}^{3}F-y\ {}^{3}G^{\circ}\ a\ {}^{3}F-x\ {}^{3}D^{\circ}\ a\ {}^{3}F-y\ {}^{3}G^{\circ}\ a\ {}^{3}F-z\ {}^{5}P^{\circ}\ -$	3-4 2-3 2-3 4-3
3626,085	4	0,02	3,44	$a {}^{3}F - z {}^{5}P^{\circ}$ $a {}^{1}D - y {}^{1}P^{\circ}$ $a {}^{3}F - z {}^{5}P^{\circ}$ $a {}^{3}F - y {}^{1}D^{\circ}$ $a {}^{1}D - x {}^{1}D^{\circ}$	3-2
3610,154	12	0,90	4,33		2-1
3606,786	4	0,02	3,46		3-3
3604,284	8	0,02	3,46		3-2
3598,714	15	0,90	4,34		2-2
3578,25	3	1,46	4,92	$b\ ^3F - s\ ^3D^\circ \ b\ ^1G - u\ ^1G^\circ \ - \ a\ ^1G - w\ ^1F^\circ \ a\ ^3H - u\ ^1G^\circ$	4-3
3574,245	8	2,27	5,73		4-4
3558,51	6	—	—		-
3547,029	15	1,50	5,00		4-3
3542,51	3	2,24	5,73		4-4
3525,161	3	1,87	5,39	$a\ {}^{3}G-r\ {}^{3}F^{\circ}$ $a\ {}^{3}G-r\ {}^{3}F^{\circ}$ $a\ {}^{3}F-y\ {}^{5}F^{\circ}$ $a\ {}^{3}F-y\ {}^{5}F^{\circ}$ $a\ {}^{3}P-w\ {}^{3}P^{\circ}$	3-2
3516,838	3	1,88	5,40		4-3
3511,626	3	0,02	3,55		3-2
3506,643	8	0,05	3,58		4-5
3499,099	8	1,07	4,61		2-1
3495,754	6	1,05	4,60	$a\ ^{3}P-w\ ^{3}P^{\circ}$ $a\ ^{3}F-y\ ^{5}F^{\circ}$ $a\ ^{3}P-w\ ^{3}P^{\circ}$ $z\ ^{3}D^{\circ}-e\ ^{3}D$ $z\ ^{3}D^{\circ}-e\ ^{3}D$	1-0
3493,280	4	0,02	3,57		3-4
3485,689	6	1,05	4,61		1-1
3481,675	3	2,50	6,06		3-3
3481,136	3	2,48	6,04		2-2

λ, λ	I	E _H , eV	E _B , eV	Transition	J
3480 ,525 3478 ,918 3476 ,452 3467 ,260 3458 ,020	12 6 3 6 3	1,07 1,05 1,07 1,05 0,84	4,63 4,61 4,63 4,63 4,42	$a\ ^{3}P-w\ ^{3}P^{\circ}\ a\ ^{3}P-w\ ^{3}P^{\circ}\ a\ ^{3}P-y\ ^{5}S^{\circ}\ a\ ^{3}P-w\ ^{3}P^{\circ}\ a\ ^{5}F-w\ ^{5}D^{\circ}$	$ \begin{array}{r} 2-2 \\ 0-1 \\ 2-2 \\ 1-2 \\ 4-3 \end{array} $
3457, 494 3456, 661 3444, 403 3443, 644 3439, 305	4 6 3 5 8	0,85 1,50 1,43 1,44 1,46	4,43 5,09 5,03 5,04 5,06	$a\ ^{5}F-u\ ^{5}D^{\circ}\ a\ ^{1}G-y\ ^{1}H^{\circ}\ b\ ^{3}F-r\ ^{3}D^{\circ}\ b\ ^{3}F-r\ ^{3}D^{\circ}\ b\ ^{3}F-r\ ^{3}D^{\circ}$	5-4 4-5 2-1 3-2 4-3
3428,956 3415,993 3411,67 3405,094 3403,369	4 5 5 4	1,89 2,43 2,41 1,05 1,07	5,50 6,06 6,04 4,69 4,71	$a \ {}^{3}G - t \ {}^{3}G^{\circ}$ $z \ {}^{3}F^{\circ} - e \ {}^{3}D$ $z \ {}^{3}F^{\circ} - e \ {}^{3}D$ $a \ {}^{3}P - u \ {}^{3}D^{\circ}$ $a \ {}^{3}P - u \ {}^{3}D^{\circ}$	5-5 4-3 3-2 1-1 2-2
3400,162 $3398,634$ $3392,713$ $3390,682$ $3385,944$	3 8 10 10 40	2,40 1,05 1,50 1,05 0,05	6,04 4,69 5,16 4,71 3,71	$z\ ^{3}F^{\circ}-e\ ^{3}D\ a\ ^{3}P-u\ ^{3}D^{\circ}\ a\ ^{1}G-v\ ^{1}F^{\circ}\ a\ ^{3}P-u\ ^{3}D^{\circ}\ a\ ^{3}F-w\ ^{3}D^{\circ}$	2—1 0—1 4—3 1—2 4—3
3385,664 3382,312 3379,216 3377,577 3377,485	12 15 15 30 20	0,05 1,07 0,05 0,02 0,05	3,74 4,73 3,72 3,69 3,72	$a \ ^{3}F - x \ ^{3}G^{\circ}$ $a \ ^{3}P - u \ ^{3}D^{\circ}$ $a \ ^{3}F - x \ ^{3}G^{\circ}$ $a \ ^{3}F - w \ ^{3}D^{\circ}$ $a \ ^{3}F - x \ ^{5}D^{\circ}$	4—3 2—3 4—4 3—2 4—3
3375,706 3371,447 3370,436 3367,881 3366,176	3 80 40 3 5	2,31 0,05 0,00 2,30 2,04	5,98 3,72 3,68 5,98 5,72	$z ^5D^{\circ} - j ^5F$ $a ^3F - x ^3G^{\circ}$ $a ^3F - w ^3D^{\circ}$ $z ^5D^{\circ} - j ^5F$ $z ^5G^{\circ} - h ^5F$	3-3 4-5 2-1 2-3 6-5
3362,100 3361,835 3361,263 3360,990 3358,479	3 10 40 10 8	2,31 0,02 0,02 0,02 2,32	5,99 3,71 3,71 3,71 6,01	$z ^5D^{\circ}-j ^5F$ $a ^3F-x ^5D^{\circ}$ $a ^3F-w ^3D^{\circ}$ $a ^3F-x ^3G^{\circ}$ $z ^5D^{\circ}-j ^5F$	3-4 3-2 3-3 3-3 4-5
3358,271 3354,634 3352,937 3348,535 3342,151	10 60 6 5 6	0,00 0,02 0,02 0,00 0,00	3,69 3,72 3,72 3,70 3,71	a ³ F-w ³ D° a ³ F-x ³ G° a ³ F-x ⁵ D° a ³ F-x ⁵ D° a ³ F-w ³ D°	2-2 3-4 3-3 2-1 2-3
3341,875 3325,229 3325,155 3324,754 3323,803	50 3 3 4 4	$0,00 \\ 2,12 \\ 2,13 \\ 2,09 \\ 2,10 \\ 2,27$	3,71 5,84 5,86 5,82 5,83 6,00	$a\ ^{3}F$ — $x\ ^{3}G^{\circ}$ $z\ ^{5}F^{\circ}$ — $g\ ^{5}G$ $b\ ^{1}G$ — $u\ ^{1}F^{\circ}$	2-3 4-4 5-5 2-2 3-3 4-3
3321,588 3318,362 3314,523 3314,422 3312,690	8 4 8 10 5	1,07 2,08 1,05 1,07 2,10	4,80 5,82 4,79 4,81 5,84	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-2 \\ 1-2 \\ 1-1 \\ 2-3 \\ 3-4 \end{array} $
3309,730 3309,501 3308,391 3306,879 3299,413	6 45 10 10 10 6	2,12 1,05 1,05 2,13 0,90 2,32	5,86 4,80 4,79 5,88 4,66	$z {}^{5}F^{\circ} - g {}^{5}G$ $a {}^{3}P - t {}^{3}D^{\circ}$ $a {}^{3}P - t {}^{3}D^{\circ}$ $z {}^{5}F^{\circ} - g {}^{5}G$ $a {}^{1}D - v {}^{3}G^{\circ}$	4-5 1-2 0-1 5-6 2-3
3294,903 3292,078 3278,922	20 12	0,90 0,90	6,08 4,66 4,68	$z {}^{5}D^{\circ} - h {}^{5}D$ $a {}^{1}D - x {}^{1}F^{\circ}$ $a {}^{1}D - u {}^{3}F^{\circ}$	$ \begin{array}{r} 4-4 \\ 2-3 \\ 2-3 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3274,047 3270,562	5 3	1,46 1,44	5,25 5,23	$b {}^{3}F - q {}^{3}D^{\circ} \\ b {}^{3}F - q {}^{3}D^{\circ}$	4—3 3—2
3260 ,259 3248 ,602 3243 ,803 3243 ,513 3238 ,224	3 15 4 3 4	1,07 1,05 0,05 2,04 2,02	4,87 4,87 3,87 5,86 5,84	$a\ ^{3}P-w\ ^{1}D^{\circ}\ a\ ^{3}P-w\ ^{1}D^{\circ}\ a\ ^{3}F-v\ ^{3}D^{\circ}\ z\ ^{5}G^{\circ}-g\ ^{5}G\ z\ ^{5}G^{\circ}-g\ ^{5}G$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 4-3 \\ 6-5 \\ 5-4 \end{array} $
3232,791 3226,128 3223,519 3222,741 3221,381	3 12 10 3 10	2,00 2,04 2,02 0,02 2,00	5,83 5,88 5,86 3,87 5,84	$z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$ $a {}^{3}F - v {}^{3}D^{\circ}$ $z {}^{5}G^{\circ} - g {}^{5}G$	4-3 $ 6-6 $ $ 5-5 $ $ 3-2 $ $ 4-4$
3219,212 3217,942 3216,203 3214,240 3213,145	8 8 3 12 8	$\begin{array}{c} 1,98 \\ 1,97 \\ 1,07 \\ 0,05 \\ 1,07 \\ 2,13 \end{array}$	5,83 5,82 4,92 3,90 4,92 5,99	$z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$ $a {}^{3}P - s {}^{3}D^{\circ}$ $a {}^{3}F - w {}^{3}G^{\circ}$ $a {}^{3}P - s {}^{3}D^{\circ}$ $z {}^{5}F^{\circ} - j {}^{5}F$	3-3 $2-2$ $2-2$ $4-4$ $2-3$ $5-4$
3209,030 3207,897 3207,337 3206,825 3206,344	4 5 5 5 5	1,97 1,98 1,05 2,00 2,02	5,83 5,84 4,92 5,86 5,88	$z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{3}P - s {}^{3}D^{\circ}$ $z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}G$	2—3 3—4 1—1 4—5 5—6
3205,848 3204,870 3203,828 3201,594 3199,915	5 6 15 5 100	0,00 1,05 0,02 1,05 0,05	3,87 4,92 3,89 4,92 3,92	$a\ ^{3}F-v\ ^{3}D^{\circ}\ a\ ^{3}P-g\ ^{3}D^{\circ}\ a\ ^{3}F-w\ ^{3}G^{\circ}\ a\ ^{3}P-s\ ^{3}D^{\circ}\ a\ ^{3}F-w\ ^{3}G^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 3-3 \\ 0-1 \\ 4-5 \end{array} $
3191,994 3186,451 3179,291 3172,731 3170,925	80 60 3 4 3	0,02 0,00 0,90 0,90 0,05	3,90 3,89 4,80 4,81 3,96	$a\ ^{3}F-w\ ^{3}G^{\circ}\ a\ ^{3}F-w\ ^{3}G^{\circ}\ a\ ^{1}D-t\ ^{3}D^{\circ}\ a\ ^{1}D-t\ ^{3}D^{\circ}\ a\ ^{3}F-z\ ^{3}H^{\circ}$	$ \begin{array}{r} 3-4 \\ 2-3 \\ 2-2 \\ 2-3 \\ 4-5 \end{array} $
3147,268 3146,260 3143,350 3141,670 3141,537	3 12 10 15	2,12 2,04 2,04 2,13 0,90	6,06 5,98 5,98 6,08 4,84	$z {}^{5}F^{\circ} - e {}^{3}D$ $z {}^{5}G^{\circ} - h {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}H$ $z {}^{5}F^{\circ} - h {}^{5}D$ $a {}^{1}D - x {}^{1}P^{\circ}$	$ \begin{array}{r} 4 - 3 \\ 6 - 6 \\ 6 - 7 \\ 5 - 4 \\ 2 - 1 \end{array} $
3139,87 3135,069 3132,707 3130,804 3130,175	10 8 6 15 8	2,02 2,00 2,00 — 1,98	5,96 5,95 5,95 — 5,94	$z {}^{5}G^{\circ} - g {}^{5}H$ $z {}^{5}G^{\circ} - g {}^{5}H$ $z {}^{5}G^{\circ} - h {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}H$	5-6 4-5 4-4 - 3-4
3129,075 3128,640	7 8		6,08 5,03 6,06	$z {}^{5}F^{\circ} - h {}^{5}D$ $a {}^{3}P - r {}^{3}D^{\circ}$ $z {}^{5}F^{\circ} - h {}^{5}D$	$ \begin{array}{c} 4-3 \\ 2-1 \\ 3-2 \end{array} $
3127,90 3127,684 3123,769	5 8 20	{ 2,12 1,98 1,97 2,04	6,08 5,94 5,93 6,01	$z {}^{5}F^{\circ} - h {}^{5}D$ $z {}^{5}G^{\circ} - h {}^{5}G$ $z {}^{5}G^{\circ} - g {}^{5}H$ $z {}^{5}G^{\circ} - j {}^{5}F$	4-4 $ 3-3 $ $ 2-3 $ $ 6-5$
3123,074 3120,212 3119,725 3118,130 3117,899	15 3 15 15 5	0,90 2,09 1,50 2,02 1,05	4,87 6,06 5,48 5,99 5,03	$a {}^{1}D - w {}^{1}D^{\circ}$ $z {}^{5}F^{\circ} - h {}^{5}D$ $a {}^{1}G - x {}^{1}H^{\circ}$ $z {}^{5}G^{\circ} - j {}^{5}F$ $a {}^{3}P - r {}^{3}D^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-2 \\ 4-5 \\ 5-4 \\ 1-1 \end{array} $
31 17 ,455 3114,092 3112,482	6 20 8	1,07 2,00 1,05	5,04 5,98 5,03	$a {}^{3}P - r {}^{3}D^{\circ}$ $z {}^{5}G^{\circ} - j {}^{5}F$ $a {}^{3}P - r {}^{3}D^{\circ}$	$ \begin{array}{c} 2-2 \\ 4-3 \\ 0-1 \end{array} $

λ, Å	I	E _H , eV	EB, eV	Transition	J
3111,283 3109,581	10 8	1 <u>,98</u>	5,96 —	z ⁵ G°—j ⁵ F	3—2 —
3407,468	12	1,97	5,96	z ${}^5G^{\circ}$ — j 5F	2—1
3106,806	8	1,05	5,04	$a^{3}P - r^{3}D^{\circ}$	1-2
3102,517	3	2,00	$^{5,99}_{5,99}$	$z {}^{5}G^{\circ} - j {}^{5}F$	4-4
3101,526	4	1,98	5,98 5,06	z ⁵ G°-j ⁵ F a ³ P-x ³ S°	3—3 2—1
3100,666	12	$\left\{ \begin{array}{c} 1,07 \\ 1,07 \end{array} \right.$	5,06 $5,06$	$a^{-3}P-r^{-3}D^{\circ}$	2—3
3093,813	3	2,04	6,05	$z^{5}G^{\circ}-k^{5}F$	6-5
3090,137	8	1,05	5,06	$a {}^{3}P - x {}^{3}S^{\circ}$	1-1
3084,819	4 3	$^{1,05}_{0,00}$	5,06	$a {}^{3}P - x {}^{3}S^{\circ}$ $a {}^{3}F - y {}^{1}F^{\circ}$	$\begin{array}{c} 0 - 1 \\ 2 - 3 \end{array}$
3042,535		$0,00 \\ 0,05$	$\frac{4,07}{4,18}$	$a {}^{3}F - y {}^{7}F$	4 -3
3002,730	3	1,43	5,56	$b^{3}F-g^{3}F^{\circ}$	2—2
3000,892	20	0,05	4,18	$a \ ^3F - w \ ^3F^{\circ}$	4-4
2990,981	3	1,44	5,59	$b_{1}^{3}F-n_{3}^{3}D^{\circ}$	3-2
2990,488	3	1,46	5,60	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4—3 2—1
$2990,\!036$ $2985,\!464$	$\frac{3}{3}$	$\substack{4,43\\0,02}$	5,57 $4,17$	$a {}^{3}F - w {}^{3}F^{\circ}$	$\frac{2-1}{3-2}$
2983,290	20	0,02	4,18	$a^{3}F-w^{3}F^{\circ}$	3-3
2974,926	$\frac{2}{4}$	$\frac{0.05}{1.07}$	5,23	$a^{3}P-q^{3}D^{\circ}$	2-2
2970,554	4	1,05	5,23	$a^{3}P-q^{3}D^{\circ}$	1-1
2970,372	10	00,00	4 ,17	$a^{3}F - w^{3}F^{\circ}$	2-2
2968,226	4	00,00	4,18	$a \ ^3F - w \ ^3F^{\circ}$	2—3
2967,218	25	0.05	4,22	$a {}^{3}F - v {}^{3}F^{\circ}$	4-3
2965,686	15	1,07	5,25	$a {}^{3}P - q {}^{3}D^{\circ}$	$\frac{2-3}{0-4}$
$2965,681 \\ 2965,231$	8 6	1,05 1,05	$5,23 \\ 5,23$	$\begin{array}{ccc} a & ^{3}P - q & ^{3}D^{\circ} \\ a & ^{3}P - q & ^{3}D^{\circ} \end{array}$	$0-1 \\ 1-2$
2959,98	5	1,03	$5,25 \\ 5,25$	$a \stackrel{7}{=} -q \stackrel{D}{=} D$	2-3
2959,71	3	1,05	5,24	$a^{-3}P-p^{-3}D^{\circ}$	1-2
2956,795	25	0,02	4,21	$a \ ^3F - v \ ^3F^{\circ}$	3-2
2956,18	70	0,05	4,24	$a \ {}^{3}F - v \ {}^{3}F^{\circ}$	4-4
2948,38	60	0.02	$^{4},^{22}$	$a {}^{3}F - v {}^{3}F^{\circ}$	3-3
2947,700	3	0,90	5,10	$a {}^{1}D - u {}^{3}G^{\circ}$	2—3
2941,963	$\frac{60}{25}$	0,00	4,21	$a \ ^3F - v \ ^3F^{\circ}$	$\frac{2-2}{2}$
2937 ,293 2933 ,526	$\frac{25}{25}$	$^{0,02}_{0,00}$	$^{4}, 24$ $^{4}, 22$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 2-3
2928,313	$\frac{20}{30}$	1,50	5,73	$a {}^{1}G - u {}^{1}G^{\circ}$	4-4
2912,082	40	0,90	5,16	$a^{-1}D-v^{-1}F^{\circ}$	2-3
2905,655	5				-
2809,154	$\frac{5}{c}$	1,05	5,46	$a {}^{3}P - o {}^{3}D^{\circ}$	$\frac{1-2}{2}$
$2805,694 \\ 2802,498$	$\frac{6}{15}$	1,07 (),90	5,48 $5,32$	$a {}^{3}P - o {}^{3}D^{\circ} \\ a {}^{1}D - w {}^{1}P^{\circ}$	$\begin{array}{c} 2-3 \\ 2-1 \end{array}$
2758,066	20	1,50	$\frac{3,32}{6,00}$	a D = u F $a G = u F$	4—3
2757,374	6	1,07	5,56	$a ^3P-w ^3S^{\circ}$	2—1
2749,031	5	1,05	5,56	a ³P−w ³S°	$\overline{1}$
2744,838	5	1,05	5,56	$a {}^{3}P - w {}^{3}S^{\circ}$	0-1
2742,297	15	0,90	5,42	$a {}^{1}D - v {}^{1}D^{\circ}$	2-2
2739 ,808	15	1,07	5,59	$a ^3P - t ^3P^{\circ}$	2—1
2735,613	6	0,90	5,43	$a {}^{1}D - u {}^{1}D^{\circ}$	2—2
$2735,283 \ 2733,264$	$\frac{10}{30}$	1,05 1,07	5,58 5,60	a ³ P—t ³ P° a ³ P—t ³ P°	$\frac{1-0}{2}$
2733,204	7	1,07	5,59	$a \stackrel{a}{}_{3}P = t \stackrel{a}{}_{3}P \circ$	$\begin{array}{c} 2-2 \\ 1-1 \end{array}$
2731,141	4	1,07	5,60	$a^{3}P-n^{3}D^{\circ}$	$\frac{1}{2} - \frac{1}{3}$
2727,420	8	1,05	5,59	$a^{3}P$ — $t^{3}P^{\circ}$	0-1
2725,081	10	1,05	5,60	$a^{3}P-t^{3}P^{\circ}$	1-2
2688,826	10		_		
2685,137	3	0,05	4,66	$a^3F-v^3G^{\circ}$	4-4
2684,795	5	_	_	_	
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λ. Α	I	E _H , eV	E _B , eV	Transition	J
2679,923 2669,592 2661,962 2657,178 2654,921	20 15 10 10 5	0,05 0,02 0,00 0,00 0,00	4,67 4,66 4,66 4,66 4,66	a ³ F - v ³ G° a ³ F - v ³ G° a ³ F - v ³ G° a ³ F - x ¹ F° a ³ F - u ³ F°	4-5 3-4 2-3 2-3 2-2
2646,631 2644,253 2641,089 2632,414 2619,940	40 40 40 15 10	0,05 0,02 0,00 0,00 0,05	4,73 4,71 4,69 4,71 4,78	$a\ ^{3}F-u\ ^{3}D^{\circ}\ a\ ^{3}F-u\ ^{3}D^{\circ}\ a\ ^{3}F-u\ ^{3}D^{\circ}\ a\ ^{3}F-u\ ^{3}D^{\circ}\ a\ ^{3}F-t\ ^{3}F^{\circ}$	4-3 3-2 2-1 2-2 4-3
2611,476 2611,288 2605,121 2604,883 2599,885	8 25 25 3 25	0,02 0,05 0,02 0,05 0,00	4,77 4,79 4,78 4,81 4,77	$a \ {}^{3}F - t \ {}^{3}F^{\circ}$ $a \ {}^{3}F - t \ {}^{3}F^{\circ}$ $a \ {}^{3}F - t \ {}^{3}F^{\circ}$ $a \ {}^{3}F - t \ {}^{3}D^{\circ}$ $a \ {}^{3}F - t \ {}^{3}F^{\circ}$	3-2 4-4 3-3 4-3 2-2
2596,564 2590,247 2586,274 2580,803 2541,910	10 5 3 5 20	0,02 $ 0,02 $ $ 0,00 $ $ - $ $ 0,05$	4,79 4,81 4,79 — 4,92	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3—4 3—3 2—1 — 4—3
2527,980 2520,534 2519,017 2470,987 2440,976	5 10 8 3 10	0,02 0,00 0,00 0,05 0,05	4,92 4,92 4,92 5,06 5,13	$a\ {}^{3}F-s\ {}^{3}D^{\circ}\ a\ {}^{3}F-s\ {}^{3}D^{\circ}\ a\ {}^{3}F-s\ {}^{3}D^{\circ}\ a\ {}^{3}F-r\ {}^{3}D^{\circ}\ a\ {}^{3}F-u\ {}^{3}G^{\circ}$	3-3 2-1 2-2 4-3 4-5
2434,067 2433,211 2424,247 2421,296 2418,362	3 6 10 10	0,05 0,02 0,05 0,02 0,00	5,14 5,11 5,16 5,14 5,12	a ³ F-s ³ F° a ³ F-u ³ G° a ³ F-s ³ F° a ³ F-s ³ F°	4-3 3-4 4-4 3-3 2-2
2384,516 2378,145 2305,665 2302,730 2299,852	4 3 12 10 10	0,05 0,02 0,05 0,02 0,00	5,25 5,23 5,42 5,40 5,39	a ³ F-q ³ D° a ³ F-q ³ D° a ³ F-r ³ F° a ³ F-r ³ F°	4-3 3-2 4-4 3-3 2-2
2294,200 2293,745 2279,964 2276,703 2273,280	3 12 10 8	0,02 0,00 0,05 0,02 0,00	5,42 5,40 5,48 5,46 5,45	a ³ F—r ³ F° a ³ F—r ³ F° a ³ F—o ³ D° a ³ F—o ³ D° a ³ F—o ³ D°	3-4 2-3 4-3 3-2 2-1
2272,613 2264,020 2244,690 2238,750 2238,20	8 5 7 8 6	$ \begin{array}{c} 0,05 \\ -0,05 \\ 0,05 \\ 0,02 \end{array} $	5,50 5,57 5,58 5,56	$a\ ^{3}F-t\ ^{3}G^{\circ}\ -\ a\ ^{3}F-q\ ^{3}F^{\circ}\ a\ ^{3}F-q\ ^{3}F^{\circ}\ -\ a\ ^{3}F-q\ ^{3}F^{\circ}\ -\ -\ -\ -\ -\ -\ -\ -\ -\ -\ -\ -\ -\$	4—5 — 4—3 4—4 3—2 —
2233,809 2230,492 2230,244 2229,67 2226,798	8 7 4 7 6	0,02 $ 0,05 $ $ 0,00 $ $ - $ $ 0,02$	5,57 5,60 5,56 — 5,59	$a\ ^{3}F-q\ ^{3}F^{\circ}\ a\ ^{3}F-n\ ^{3}D^{\circ}\ a\ ^{3}F-q\ ^{3}F^{\circ}\ -a\ ^{3}F-n\ ^{3}D^{\circ}$	3—3 4—3 2—2 — 3—2
2225,11 2223,199 2219,75 2218,38 2143,52	8 7 5 5 6	0,00 0,02 0,00	5,57 5,60 5,59	a ³ F-n ³ D° a ³ F-n ³ D° a ³ F-n ³ D°	2-1 3-3 2-2 -
2142,05 2139,41	5 5	-	_		

λ, λ	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
2126,89	5	_		_	_
2126,89 2123,50	7	_	_		_
2121,90 2117,01	6	_	_	<u> </u>	_
2117,01	6	-	_	_	_

Ti II, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^6 \, 3d^2 \, 4s^4 F_{3/2}$ Ionization potential 110 000 cm⁻¹; 13,637 eV

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
6717,911 6680,26 6559,580 6491,61 6212,30	1 1 1 2 1	3,12 3,09 2,05 2,06 2,65	4,97 4,95 3,94 3,97 4,64	$c\ ^{2}D-b\ ^{2}F^{\circ}\ c\ ^{2}D-b\ ^{2}F^{\circ}\ b\ ^{2}P-z\ ^{2}D^{\circ}\ b\ ^{2}P-z\ ^{2}D^{\circ}\ a\ ^{2}S-z\ ^{2}S^{\circ}$	7/2 - 9/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 5/2$ $1/2 - 1/2$
5473,517 5452,03 5422,47 5396,30 5381,020	1 1 1 1	2,65 2,65 1,57 1,58 1,57	4,91 4,92 3,86 3,88 3,87	$a\ ^2S-z\ ^2P^\circ \ a\ ^2S-z\ ^2P^\circ \ a\ ^2H-z\ ^4F^\circ \ a\ ^2H-z\ ^4F^\circ \ b\ ^2D-z\ ^2F^\sigma$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 1/2 \\ 9/2 - 7/2 \\ 11/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
5336,809 5268,62 5226,534 5188,700 5185,90	4 1 5 6 2	1,58 2,60 1,57 1,58 1,89	3,90 4,95 3,94 3,97 4,28	$b\ ^{2}D-z\ ^{2}F^{\circ}\ b\ ^{2}F-y\ ^{2}F^{\circ}\ b\ ^{2}D-z\ ^{2}D^{\circ}\ b\ ^{2}D-z\ ^{2}D^{\circ}\ b\ ^{2}G-z\ ^{2}G^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
5129,143 5072,30 4839,251 4805,105 4798,535	1 2 1 2 2	1,89 3,12 2,65 2,06 1,08	4,31 5,57 5,21 4,64 3,66	$b\ ^2G-z\ ^2G^{\circ}\ c\ ^2D-x\ ^2D^{\circ}\ a\ ^2S-z\ ^4P^{\circ}\ b\ ^2P-z\ ^2S^{\circ}\ a\ ^2D-z\ ^4G^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
4779,986 4764,535 4762,77 4719,515 4655,75	1 1 1 1	2,05 1,24 1,08 1,24 1,16	4,64 3,84 3,69 3,87 3,82	$b\ ^{2}P-z\ ^{2}S^{\circ}$ $a\ ^{2}P-z\ ^{4}F^{\circ}$ $a\ ^{2}D-z\ ^{4}G^{\circ}$ $b\ ^{4}P-z\ ^{2}F^{\circ}$ $a\ ^{4}P-z\ ^{4}F^{\circ}$	1/2 - 1/2 $3/2 - 5/2$ $5/2 - 7/2$ $5/2 - 5/2$ $1/2 - 3/2$
4636,345 4629,29 4589,961 4583,443 4580,458	1 1 2 1 1	1,16 1,18 1,24 1,16 1,23	3,84 3,86 3,94 3,87 3,94	$a \stackrel{4}{P} - z \stackrel{4}{F}^{\circ}$ $a \stackrel{4}{P} - z \stackrel{4}{F}^{\circ}$ $a \stackrel{2}{P} - z \stackrel{2}{2}D^{\circ}$ $a \stackrel{4}{P} - z \stackrel{2}{2}F^{\circ}$ $b \stackrel{4}{P} - z \stackrel{2}{2}D^{\circ}$	3/2 - 5/2 $5/2 - 7/2$ $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 3/2$
4571,971 4563,761 4549,622 4533,966 4501,270	50 30 60 30 40	1,57 1,22 1,58 1,25 1,12	4,28 3,94 4,31 3,97 3,87	$a\ ^{2}H-z\ ^{2}G^{\circ}\ a\ ^{2}P-z\ ^{2}D^{\circ}\ a\ ^{2}H-z\ ^{2}G^{\circ}\ a\ ^{2}P-z\ ^{2}D^{\circ}\ a\ ^{2}G-z\ ^{2}F^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ 1/2 - 3/2 \\ 11/2 - 9/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \end{array} $
4488,319 4468,493 4450,487 4443,802 4417,718	15 50 10 50 40	3,12 1,13 1,08 1,08 1,16	5,88 3,90 3,87 3,87 3,97	$c^{2}D-x^{2}F^{\circ}$ $a^{2}G-z^{2}F^{\circ}$ $a^{2}D-z^{2}F^{\circ}$ $a^{2}D-z^{2}F^{\circ}$ $a^{2}D-z^{2}F^{\circ}$ $a^{4}P-z^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4411,080 4399,767 4395,848 4395,031 4394,057	15 35 2 60 2	3,09 1,24 1,24 1,08 1,22	5,90 4,05 4,06 3,90 4,04	$c\ ^{2}D-x\ ^{2}F^{\circ}\ a\ ^{2}P-z\ ^{4}D^{\circ}\ b^{4}P-z\ ^{4}D^{\circ}\ a\ ^{2}D-z\ ^{2}F^{\circ}\ a\ ^{2}P-z\ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \end{array} $

λ, λ	I	$E_{ m H}$, eV	E _B , eV	Transition	J
4386,858 4367,657 4344,291 4337,916 4314,979	10 15 2 50 40	2,60 2,59 1,08 1,08 1,16	5,42 5,43 3,94 3,94 4,03	$b^{\ 2}F - y^{\ 2}G^{\circ} \ b^{\ 2}F - y^{\ 2}G^{\circ} \ a^{\ 2}D - z^{\ 2}D^{\bullet} \ a^{\ 2}D - z^{\ 2}D^{\circ} \ a^{\ 4}P - z^{\ 4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4312,861 4307,900 4301,928 4300,052 4294,101	35 40 15 60 10	1,18 1,16 1,16 1,18 1,08	4,05 4,04 4,04 4,06 3,97	$a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{2}D-z\ ^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
4290,222 4287,893 4174,088 4171,897 4163,644	50 2 2 30 40	1,16 1,08 2,60 2,60 2,59	4,05 3,97 5,57 5,57 5,57	$a {}^{4}P - z {}^{4}D^{\circ}$ $a {}^{2}D - z {}^{2}D^{\circ}$ $b {}^{2}F - x {}^{2}D^{\circ}$ $b {}^{2}F - x {}^{2}D^{\circ}$ $b {}^{2}F - x {}^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
4053,814 4028,332 4025,136 4012,372 3932,007	3 7 2 4 2	1,89 1,89 0,57 0,57 1,13	4,95 4,97 3,69 3,66 4,28	$b\ {}^2G - y\ {}^2F^{\circ} \ b\ {}^2G - y\ {}^2F^{\circ} \ a\ {}^2F - z\ {}^4G^{\circ} \ a\ {}^2F - z\ {}^4G^{\circ} \ a\ {}^2G - z\ {}^2G^{\circ}$	7/2 - 5/2 $9/2 - 7/2$ $7/2 - 7/2$ $5/2 - 5/2$ $9/2 - 7/2$
3913,464 3900,546 3814,580 3813,390 3796,899	60 70 4 2 2	1,12 1,13 0,57 0,57 0,57	4,28 4,31 3,82 3,86 3,84	$a \ ^{2}G - z \ ^{2}G^{\circ}$ $a \ ^{2}G - z \ ^{2}G^{\circ}$ $a \ ^{2}F - z \ ^{4}F^{\circ}$ $a \ ^{2}F - z \ ^{4}F^{\circ}$ $a \ ^{2}F - z \ ^{4}F^{\circ}$	7/2 - 7/2 $9/2 - 9/2$ $5/2 - 3/2$ $7/2 - 7/2$ $5/2 - 5/2$
3776,062 3774,650 3761,866 3761,320 3759,291	6 3 15 200 200	1,58 0,57 2,59 0,57 0,57	4,86 3,86 5,88 3,87 3,90	$b\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{2}F-z\ ^{4}F^{\circ}\ b\ ^{2}F-x\ ^{2}F^{\circ}\ a\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{2}F-z\ ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 3/2 \\ 5/2 7/2 \\ 7/2 7/2 \\ 5/2 - 5/2 \\ 7/2 7/2 \end{array} $
3757,684 3748,010 3741,633 3721,632 3706,219	30 10 50 15 20	1,57 2,60 1,58 0,57 1,57	4,86 5,90 4,89 3,90 4,91	$b\ ^{2}D-y\ ^{2}D^{\circ}\ b\ ^{2}F-x\ ^{2}F^{\circ}\ b\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{2}F-z\ ^{2}F^{\circ}\ b\ ^{2}D-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
3685,192 3679,673 3662,237 3659,765 3641,330	250 3 40 60 100	{ 0,57 0,57 1,58 1,57 1,58 1,24	3,97 3,94 4,95 4,95 4,97 4,64	$egin{array}{l} a\ ^2F-z\ ^2D^\circ \ a\ ^2F-z\ ^2D^\circ \ b\ ^2D-y\ ^2F^\circ \ b\ ^2D-y\ ^2F^\circ \ b\ ^2D-y\ ^2F^\circ \ a\ ^2P-z\ ^2S^\circ \end{array}$	7/2— $5/2$ $5/2$ — $3/2$ $5/2$ — $5/2$ $3/2$ — $5/2$ $5/2$ — $7/2$ $3/2$ — $1/2$
3624,826 3596,048 3593,093 3587,130 3573,737	70 60 2 12 20	1,22 0,57 1,58 0,57 0,57	4,64 4,05 5,03 4,06 4,04	$a^{2}P-z^{2}S^{\circ}$ $a^{2}F-z^{4}D^{\circ}$ $b^{2}D-y^{4}D^{\circ}$ $a^{2}F-z^{4}D^{\circ}$ $a^{2}F-z^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
3566,00 3565,326 3561,575 3535,408 3533,868	6 3 3 40 2	1,16 1,58 0,57 2,06 2,06	4,64 5,06 4,05 5,57 5,57	$a\ ^4P-z\ ^2S^\circ \ b\ ^2D-y\ ^4D^\circ \ a\ ^2F-z\ ^4D^\circ \ b\ ^2P-x\ ^2D^\circ \ b\ ^2P-x\ ^2D^\circ \ b\ ^2P-x\ ^2D^\circ$	3/2 - 1/2 $5/2 - 7/2$ $5/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$ $1/2 - 3/2$
3520, 253 3510, 840 3509, 844 3504, 890 3500, 340 3492, 39	20 60 3 80 2 3	2,05 1,89 1,89 1,89 0,12 4,28	5,57 5,42 5,42 5,43 3,66 7,83	$egin{array}{cccc} b\ ^2G-y\ ^2G^\circ \ b\ ^2G-y\ ^2G^\circ \ b\ ^2G-y\ ^2G^\circ \ b\ ^4F-z\ ^4G^\circ \ z\ ^2G^\circ-e\ ^2F \end{array}$	7/2 $-7/2$ $9/2$ $-7/2$ $9/2$ $-9/2$ $5/2$ $-5/2$ $-5/2$
3491,053 3489,739	10 2	0,11 0,13	3,66 3,69	$b \stackrel{4}{F} - z \stackrel{4}{G}^{\circ}$ $b \stackrel{4}{F} - z \stackrel{4}{G}^{\circ}$	$\frac{3}{2} - \frac{5}{2}$ $\frac{7}{2} - \frac{7}{2}$

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
3483,80 3477,181	4 15	4,31 0,12	7,87 3,69	z ² G°—e ² F b ⁴ F—z ⁴ G°	$\frac{9}{2}$ -7/2 $\frac{5}{2}$ -7/2
3465,562 3461,496 3456,390 3452,470 3444,306	3 20 20 4 30	2,06 0,13 2,06 2,05 0,15	5,64 3,72 5,65 5,64 3,75	$b\ ^{2}P-y\ ^{2}P^{c}\ b\ ^{4}F-z\ ^{4}G^{c}\ b\ ^{2}P-y\ ^{2}P^{c}\ b\ ^{2}P-y\ ^{2}P^{c}\ b\ ^{4}F-z\ ^{4}G^{\circ}$	$ \frac{3}{2} - \frac{1}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{9}{2} - \frac{11}{2} $
3416,957 3409,809 3407,205 3402,422 3394,574	2 4 3 8 40	1,24 0,03 0,05 1,22 0,01	4,86 3,66 3,69 4,86 3,66	$a\ ^{2}P-y\ ^{2}D^{\circ} \ a\ ^{4}F-z\ ^{4}G^{\circ} \ a\ ^{4}F-z\ ^{4}G^{\circ} \ a\ ^{2}P-y\ ^{2}D^{\circ} \ a\ ^{4}F-z\ ^{4}G^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 9/2 - 7/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
3388,755 3387,834 3383,761 3380,278 3374,352	8 50 125 30 8	1,24 0,03 0,00 0,05 1,24	4,89 3,69 3,66 3,72 4,91	$a\ ^{2}P-y\ ^{2}D^{\circ}$ $a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{2}P-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 9/2 - 9/2 \\ 3/2 - 3/2 \end{array} $
3372,800 3372,208 3369,212 3366,176 3361,213	100 10 2 8 125	0,01 0,57 1,23 1,24 0,03	3,69 4,28 4,91 4,92 3,72	$a\ ^4F-z\ ^4G^{\circ}\ a\ ^2F-z\ ^2G^{\circ}\ b\ ^4P-z\ ^2P^{\circ}\ a\ ^2P-z\ ^2P^{\circ}\ a\ ^4F-z\ ^4G^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 7/2 - 9/2 \end{array} $
3352,071 3349,399 3349,035 3348,844 3346,724	5 125 7 5 10 15	1,22 0,05 0,57 0,12 0,13	4,92 3,75 4,31 3,82 3,84	$a\ ^{2}P-z\ ^{2}P^{\circ}\ a\ ^{4}F-z\ ^{4}G^{\circ}\ a\ ^{2}F-z\ ^{2}G^{\circ}\ b\ ^{4}F-z\ ^{4}F^{\circ}\ b\ ^{4}F-z\ ^{4}F^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 9/2 - 11/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
3343 ,770 3341 ,875 3340 ,344 3337 ,85 3335 ,192	10 100 35 2 40	0,15 0,57 0,11 1,24 0,12	3,86 4,28 3,82 4,95 3,84	$b\ ^4F - z\ ^4F^\circ \ a\ ^2F - z\ ^2G^\circ \ b\ ^4F - z\ ^4F^\circ \ a\ ^2P - y\ ^2F^\circ \ b\ ^4F - z\ ^4F^\circ$	$ \begin{array}{c} 9/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
3332,111 3329,455 3326,762 3322,936 3321,700	30 70 20 75 25	1,24 0,13 0,12 0,15 1,23	4,96 3,86 3,84 3,88 4,96	$b\ ^4P - z\ ^4S^{\circ}$ $b\ ^4F - z\ ^4F^{\circ}$ $b\ ^4F - z\ ^4F^{\circ}$ $b\ ^4F - z\ ^4F^{\circ}$ $b\ ^4P - z\ ^4S^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \\ 9/2 - 9/2 \\ 3/2 - 3/2 \end{array} $
3318,024 3315,324 3308,806 3301,71 3288,575	10 10 8 2 5	0,12 1,22 0,13 1,16 1,23	3,86 4,96 3,88 4,92 5,00	$b\ ^{4}F-z\ ^{4}F^{\circ}\ b\ ^{4}P-z\ ^{4}S^{\circ}\ b\ ^{4}F-z\ ^{4}F^{\circ}\ a\ ^{4}P-z\ ^{2}P^{\circ}\ b\ ^{4}P-y\ ^{4}D^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
3288,428 3287,64 3282,329 3279,995 3278,922	5 40 20 4 35	1,24 1,89 1,23 1,12 1,08	5,01 5,66 5,01 4,89 4,86	$b\ ^4P-y\ ^4D^{\circ}\ b\ ^2G-z\ ^2H^{\circ}\ b\ ^4P-y\ ^4D^{\circ}\ a\ ^2G-y\ ^2D^{\circ}\ a\ ^2D-y\ ^2D^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 9/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array}$
3278,290 3276,774 3275,293 3272,080 3271,625	30 5 3 25 25	1,23 1,18 1,08 1,22 1,24	5,01 4,96 4,86 5,01 5,03	$b\ ^4P-y\ ^4D^{\circ}\ a\ ^4P-z\ ^4S^{\circ}\ a\ ^2D-y\ ^2D^{\circ}\ b\ ^4P-y\ ^4D^{\circ}\ b\ ^4P-y\ ^4D^{\circ}$	3/2 $-3/2$ $5/2$ $-3/2$ $3/2$ $-3/2$ $1/2$ $-3/2$ $5/2$ $-5/2$
3263,686 3261,596 3260,259 3254,250 3252,914	4 60 3 30 40	1,16 { 1,89 1,23 1,16 0,05 0,03	4,96 5,69 5,03 4,96 3,86 3,84	$a {}^{4}P - z {}^{4}S^{\circ}$ $b {}^{2}G - z {}^{2}H^{\circ}$ $b {}^{4}P - y {}^{4}D^{\circ}$ $a {}^{4}P - z {}^{4}S^{\circ}$ $a {}^{4}F - z {}^{4}F^{\circ}$ $a {}^{3}F - z {}^{4}F^{\circ}$	3/2 - 3/2 $9/2 - 11/2$ $3/2 - 5/2$ $1/2 - 3/2$ $9/2 - 7/2$ $7/2 - 5/2$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3251,911 3249,370 3248,602 3241,984	30 2 50 60	0,01 1,08 1,24 0,00	3,82 4,89 5,06 3,82	$egin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3239,664 3239,037 3236,573 3236,122 3234,517 3232,280	30 60 70 20 75 30	1,08 0,01 0,03 1,08 0,05 1,12	4,91 3,83 3,86 4,91 3,88 4,95	$a ext{-}D = z ext{-}F$ $a ext{-}F = z ext{-}F^{\circ}$ $a ext{-}F = z ext{-}F^{\circ}$ $a ext{-}D = z ext{-}P^{\circ}$ $a ext{-}F = z ext{-}F^{\circ}$ $a ext{-}F = z ext{-}F^{\circ}$ $a ext{-}G = y ext{-}F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 9/2 - 9/2 \\ 7/2 - 5/2 \end{array} $
3231,315 3229,397 3229,193 3228,605 3226,771	4 35 40 30 2	0,13 1,13 0,00 1,08 0,03	3,97 4,97 3,84 4,92 3,87	$\begin{array}{c} b \ ^{4}F - z \ ^{2}D^{\circ} \\ u \ ^{2}G - y \ ^{2}F^{\circ} \\ a \ ^{4}F - z \ ^{4}F^{\circ} \\ a \ ^{2}D - z \ ^{2}P^{\circ} \\ a \ ^{4}F - z \ ^{2}F^{\circ} \end{array}$	7/2 - 5/2 $9/2 - 7/2$ $3/2 - 5/2$ $3/2 - 1/2$ $7/2 - 5/2$
3224,241 3222,843 3218,270 3217,056 3214,750	35 35 25 30 4	1,58 0,01 1,57 0,03 0,05	5,43 3,86 5,42 3,88 3,90	$a^{2}H-y^{2}G^{\circ}$ $a^{4}F-z^{4}F^{\circ}$ $a^{2}H-y^{2}G^{\circ}$ $a^{4}F-z^{4}F^{\circ}$ $a^{4}F-z^{2}F^{\circ}$	$ \begin{array}{c} 11/_2 - 9/_2 \\ 5/_2 - 7/_2 \\ 9/_2 - 7/_2 \\ 7/_2 - 9/_2 \\ 9/_2 - 7/_2 \end{array} $
3203,435 3202,535 3197,518 3195,717 3194,76	3 40 2 3 6	0,00 1,08 0,03 1,08	3,87 4,95 3,90 4,96	a ⁴ F - z ² F° a ² D - y ² F° a ⁴ F - z ² F° a ² D - z ⁴ S°	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{5}{2} - \frac{3}{2} $
3194,56 3194,26 3192,68 3192,26 3190,874	8 5 4 2 30	3,88 3,86 3,84 1,08 1,08	7,76 7,74 7,72 4,96 4,97	$z {}^{4}F^{\circ} - e {}^{4}F$ $z {}^{4}F^{\circ} - e {}^{4}F$ $z {}^{4}F^{\circ} - e {}^{4}F$ $a {}^{2}D - z {}^{4}S^{\circ}$ $a {}^{2}D - y {}^{4}F^{\circ}$	9/2 - 9/2 $7/2 - 7/2$ $5/2 - 5/2$ $3/2 - 3/2$ $5/2 - 7/2$
3189,52 3184,09 3182,57 3181,84 3180,225	5 2 6 8 2	3,82 0,01 3,94 3,97 3,82	7,71 3,90 7,83 7,87 7,72	$z^{4}F^{\circ}-e^{4}F$ $a^{4}F-z^{2}F^{\circ}$ $z^{2}D^{\circ}-e^{2}F$ $z^{2}D^{\circ}-e^{2}F$ $z^{4}F^{\circ}-e^{4}F$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 5/2$ $5/2 - 7/2$ $3/2 - 5/2$
3178,630 3175,66 3174,80 3168,519 3164,91	3 2 5 40 8	3,84 3,86 — 0,15	7,74 7,76 — 4,06 —	$z {}^{4}F^{\circ} - e {}^{4}F$ $z {}^{4}F^{\circ} - e {}^{4}F$ $ b {}^{4}F - z {}^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ - \\ 9/2 - 7/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
3162,570 3161,755 3161,205 3157,397 3155,670	$35 \\ 30 \\ 25 \\ 2 \\ 12$	0,13 0,12 0,11 0,01 0,13	4,05 4,04 4,03 3,97 4,06	$b\ {}^4F - z\ {}^4D^\circ \ b\ {}^4F - z\ {}^4D^\circ \ b\ {}^4F - z\ {}^4D^\circ \ a\ {}^4F - z\ {}^2D^\circ \ b\ {}^4F - z\ {}^4D^\circ$	7/2 $5/2$ $5/2$ $3/2$ $3/2$ $1/2$ $5/2$ $3/2$ $7/2$
3154,195 3152,251 3148,033 3143,756 3130,804	12 15 12 10 15	0,14 0,12 0,00 0,03 0,01	4,04 4,05 3,94 3.97 3,97	$b^{4}F - z^{4}D^{\circ} \\ b^{4}F - z^{4}D^{\circ} \\ a^{4}F - z^{2}D^{\circ} \\ a^{4}F - z^{2}D^{\circ} \\ a^{4}F - z^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
3128,640 3127,883 3122,065 3119,800 3118,85	$10 \\ 10 \\ 2 \\ 15 \\ 2$	3,90 3,87 1,24 1,24 1,08	7,87 7,83 5,21 5,22 5,06	$z^{2}P^{\circ}-e^{2}F$ $z^{2}F^{\circ}-e^{2}F$ $a^{2}P-z^{4}P^{\circ}$ $b^{4}P-z^{4}P^{\circ}$ $a^{2}D-y^{4}D^{\circ}$	$\begin{array}{c} 7/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \end{array}$
3117,669 3112,050 3110,620	20 10 20	1,23 1,22 1,23	5,21 5,21 5,22	$b^{4}P - z^{4}P^{\circ} b^{4}P - z^{4}P^{\circ} b^{4}P - z^{4}P^{\circ}$	$\begin{array}{c} {}^{3}/_{2} - {}^{1}/_{2} \\ {}^{1}/_{2} - {}^{1}/_{2} \\ {}^{3}/_{2} - {}^{3}/_{2} \end{array}$

λ, Å	I	$E_{ m H}^{}$, eV	EB, eV	Transition	J
3110,095 3106,234	8 35	1,58 1,24	5,57 5,23	$b^{2}D - x^{2}D^{\circ} \\ b^{4}P - z^{4}P^{\circ}$	⁵ / ₂ — ⁵ / ₂ ⁵ / ₂ — ⁵ / ₂
3105,084 3104,593 3103,804 3102,975 3102,975	$\begin{array}{c} 20 \\ 3 \\ 50 \\ 2 \\ 2 \end{array}$	1,22 1,89 1,89 1,22 1,22	5,22 5,88 5,88 5,22 5,22	$b\ ^4P-z\ ^4P^\circ\ b\ ^2G-x\ ^2F^\circ\ b\ ^2G-x\ ^2F^\circ\ a\ ^2P-z\ ^4P^\circ\ a\ ^2P-z\ ^4P^\circ$	1/2 - 3/2 $7/2 - 7/2$ $9/2 - 7/2$ $1/2 - 3/2$ $1/2 - 3/2$
3097,186 3096,424 3090,051 3089,401 3088,027	25 2 8 15 75	1,23 1,57 3,75 1,89 0,05	5,23 5,57 7,76 5,90 4,06	$b^{4}P - z^{4}P^{\circ} \\ b^{2}D - x^{2}D^{\circ} \\ z^{4}G^{\circ} - e^{4}F \\ b^{2}G - x^{2}F^{\circ} \\ a^{4}F - z^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 11/2 - 9/2 \\ 7/2 - 5/2 \\ 9/2 - 7/2 \end{array} $
3081,575 3078,645 3075,225 3072,971 3072,107	5 50 40 40 30	3,72 0,03 0,01 0,00 0,03	7,76 4,05 4,04 4,03 4,06	$z {}^{4}G^{\circ} - e {}^{4}F$ $a {}^{4}F - z {}^{4}D^{\circ}$	$\begin{array}{c} 9/2 - 7/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 7/2 - 7/2 \end{array}$
3071,242 3066,514 3066,354 3066,220 3063,502	15 3 20 30 4	1,18 1,16 0,00 0,01 1,16	5,22 5,21 4,04 4,05 5,21	a ⁴ P — z ⁴ P ° a ⁴ P — z ⁴ P ° a ⁴ F — z ⁴ D ° a ⁴ F — z ⁴ D ° a ⁴ P — z ⁴ P °	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \end{array}$
3063,280 3059,741 3058,090 3057,395 3056,740	2 6 4 50 10 15	3,66 1,16 0,01 1,18 0,00 1,16	7,71 5,22 4,06 5,23 3,97 5,22	$z^{4}G^{\circ}-e^{4}F$ $a^{4}P-z^{4}P^{\circ}$ $a^{4}F-z^{4}D^{\circ}$ $a^{4}P-z^{4}P^{\circ}$ $a^{4}F-z^{2}D^{\circ}$ $a^{4}P-z^{4}P^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
3048,766 3046,685 3045,085 3043,851 3038,706	6 30 5 5 6	1,58 1,16 1,57 1,58	5,65 5,23 - 5,64 5,66	$b\ ^{2}D-y\ ^{2}P^{\circ}\ a\ ^{4}P-z\ ^{4}P^{\circ}\ -\ b\ ^{2}D-y\ ^{2}P^{\circ}\ a\ ^{2}H-z\ ^{2}H^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ - \\ 3/2 - 1/2 \\ 11/2 - 9/2 \end{array} $
3029,730 3023,86 3022,820 3017,187 3008,322	35 12 15 50 2	1,57 4,28 4,31 1,58 1,57	5,66 8,33 8,41 5,69 5,69	$a\ ^{2}H-z\ ^{2}H^{\circ}\ z\ ^{2}G^{\circ}-e\ ^{2}G\ z\ ^{2}G^{\circ}-e\ ^{2}G\ a\ ^{2}H-z\ ^{2}H^{\circ}\ a\ ^{2}H-z\ ^{2}H^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 7/2 - 7/2 \\ 9/2 - 9/2 \\ 11/2 - 11/2 \\ 9/2 - 11/2 \end{array} $
2995,75 2990,17 2979,20 2977,80 2958,98	5 10 10 7 50	3,97 3,94 — 4,28	8,12 8,10 - 8,47	$z\ {}^{2}D^{\circ} - f\ {}^{2}F \ z\ {}^{2}D^{\circ} - f\ {}^{2}F \ z\ {}^{2}D^{\circ} - f\ {}^{2}F \ - z\ {}^{2}G^{\circ} - e\ {}^{2}H$	$ \begin{array}{c}\\ 5/2 - 7/2\\ 3/2 - 5/2\\\\ 7/2 - 9/2 \end{array} $
2958,30 2954,76 2952,10 2945,47 2943,12	2 60 4 50 12	3,88 4,31 3,86 3,88 3,90	8,07 8,50 8,06 8,09 8,12	$z {}^{4}F^{\circ} - e {}^{4}G$ $z {}^{2}G^{\circ} - e {}^{2}H$ $z {}^{4}F^{\circ} - e {}^{4}G$ $z {}^{4}F^{\circ} - e {}^{4}G$ $z {}^{2}F^{\circ} - f {}^{2}F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2941,993 2941,39 2938,69 2936,17 2931,27	50 8 30 30 40	3,86 - 3,84 3,82 3,87	8,07 8,06 9,04 8,10	$egin{array}{cccccccccccccccccccccccccccccccccccc$	7/2 $9/2$ $5/2$ $7/2$ $9/2$
2928,69 2927,87 2926,75 2918,77 2916,09	15 2 10 2 10	3,88 3,88 3,87 —	8,11 8,12 8,12 -	z ⁴ F°—e ⁴ H z ⁴ F°—f ² F z ² F°—f ² F	9/2—11/2 9/2—7/2 5/2—7/2

<u> </u>				To catalo	
λ, Α	I	E _H , eV	E _B , eV	Transition	J
2914,89 2913,34	10 10	_	_	_	_
2913,08 2909,912 2908,14	1 7 4	0,03 0,05	4,28 4,31	$ \begin{array}{c} a \ {}^{4}F - z \ {}^{2}G^{\circ} \\ a \ {}^{4}F - z \ {}^{2}G^{\circ} \\ - & - \end{array} $	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{9}{2}$
2906,69 2891,050	20 15		 4,89	$a^{2}F-y^{2}D^{\circ}$	$ ^{7}/_{2}$ $^{-}$ $^{5}/_{2}$
2890,59 2888,923 2888,62	8 15 10	0,57	4,86	$a {}^{2}F - y {}^{2}D^{\circ}$	5/2—3/2 —
2887,456 2884,099	$\frac{2}{70}$	1,13 1,13	5,42 5,43	$a\ ^{2}G-y\ ^{2}G^{\circ}\ a\ ^{2}G-y\ ^{2}G^{\circ}$	$^{9/}_{2}$ $^{-7/}_{2}$ $^{9/}_{2}$ $^{-9/}_{2}$ $^{5/}_{2}$ $^{-7/}_{2}$
2880 ,28 2877 ,418 2875 ,79	3 60 10	1,58 1,12 —	5,88 5,42 —	b 2D-x 2F° a 2G-y 2G°	*/ ₂ — ⁷ / ₂ */ ₂ — ⁷ / ₂ —
2875,39 2874,08	15 2	 1,12	 5,43		
2870 ,04 2868 ,732 2862 ,34	25 15 30	0,57 1,24	4,89 5,57	$a {}^2F - y {}^2D^{\circ} \ a {}^2P - x {}^2D^{\circ}$	$\frac{-}{5/2}$ $\frac{5}{2}$ $\frac{5}{2}$
2861 ,99 2861 ,291	20 3	 1,24	5,57	$a^{2}P$ — $x^{2}D^{\circ}$	3/ ₂ —3/ ₂
2860,79 2858,399 2857,79	4 8 15	0,57	4,91	$a^{2}F - z^{2}P^{\circ}$	5/2—3/ ₂
2856,616 2856,24	$\frac{2}{25}$	1,57 3,75	5,90 8,09	$b^{2}D - x^{2}F^{\circ}$ $z^{4}G^{\circ} - e^{4}G$	$\frac{3}{2}$ $\frac{-5}{2}$ $\frac{11}{2}$ $\frac{-11}{2}$ $\frac{7}{2}$
2853,922 2851,087 2846,09	10 20 15	0,57 1,22 3,72	4,95 5,57 8,07	$a {}^{2}F - y {}^{2}F^{\circ} \ a {}^{2}P - x {}^{2}D^{\circ} \ z {}^{4}G^{\circ} - e {}^{4}G$	$\begin{array}{c} 7/2 - 5/2 \\ 1/2 - 3/2 \\ 9/2 - 9/2 \end{array}$
2844,09 2841,914	$\frac{2}{30}$	3,69 0,57	8,04 4,97	$z {}^{4}G^{\circ} -e {}^{4}G$ $a {}^{2}F -y {}^{2}F^{\circ}$ $z {}^{4}G^{\circ} -e {}^{4}H$	$^{7/2}_{^{7/2}}_{^{7/2}}^{^{5/2}}_{^{7/2}}_{^{11/2}}^{^{11/2}}$
2839,70 2836,60 2834,14	15 15 10	$3,75 \\ 3,69 \\ 3,72$	8,11 8,06 8,09	$z \stackrel{4}{\circ}G \stackrel{-}{\circ} - e \stackrel{4}{\circ}G$ $z \stackrel{4}{\circ}G \stackrel{-}{\circ} - e \stackrel{4}{\circ}G$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{11}{2}$
2832,158 2828,87	20 30	$0,57 \\ 3,72$	4,95 8,10	$a^{2}F - y^{2}F^{\circ}$ $z^{4}G^{\circ} - e^{4}H$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{9}{2}$ $\frac{9}{2}$ $\frac{9}{2}$ $\frac{5}{2}$
2828,80 2828,150 2827,22	30 60 10	3,66 3,75 3,69	8,04 8,13 8,07	$z {}^{4}G^{\circ} - e {}^{4}G$ $z {}^{4}G^{\circ} - e {}^{4}H$ $z {}^{4}G^{\circ} - e {}^{4}G$	$^{5/_{2}-5/_{2}}_{^{11}/_{2}-^{13}/_{2}}^{^{11}/_{2}-^{5}/_{2}}$
2821,41 2820,36	8	3,66 0,57	8,06 4,96	$z^{4}G^{\circ}-e^{4}G$ $a^{2}F-y^{2}F^{\circ}$	5/ ₂ —7/ ₂ 5/ ₂ —7/ ₂
2819,99 2817,838 2815,57	$\begin{matrix} 8 \\ 60 \\ 2 \end{matrix}$	3,69 3,72 1,16	8,08 8,11 5,57	$z {}^{4}G^{\circ} - e {}^{4}H$ $z {}^{4}G^{\circ} - e {}^{4}H$ $a {}^{4}P - x {}^{2}D^{\circ}$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{11}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2810 ,276 2806 ,407	50 5	3,69 1,22	8,10 5,64	$z^{4}G^{\circ}-c^{4}II$ $a^{2}P^{\circ}-y^{2}P^{\circ}$	$^{7/2}_{2}$ $^{9/2}_{1/2}$ $^{1/2}_{5/2}$ $^{-7/2}$
2805,00 2800,65 2790,62	40 30 3	3,66 3,88 3,86	8,08 8,31 8,30	$z \stackrel{4}{\circ} - e \stackrel{4}{\circ} H$ $z \stackrel{4}{\circ} - e \stackrel{4}{\circ} D$ $z \stackrel{4}{\circ} - e \stackrel{4}{\circ} D$	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
2788,00 2785,99	8 6	3,84 3,86	8,28 8,31	$z^{4}F^{\circ}-e^{4}D$ $z^{4}F^{\circ}-e^{4}D$	$^{5/2}_{7/2}^{-3/2}_{7/2}^{7/2}_{7/2}^{-7/2}$
2784 ,648 2782 ,30 2780 ,55	3 2 5	0,57 3,82 0,57	5,06 8,28 5,03	$a\ ^{2}F-y\ ^{4}D^{\circ}\ z\ ^{4}F^{\circ}-e\ ^{4}D\ a\ ^{2}F-y\ ^{4}D^{\circ}$	$\frac{\frac{1}{2}-\frac{1}{2}}{\frac{3}{2}-\frac{1}{2}}$ $\frac{\frac{1}{2}-\frac{5}{2}}{\frac{5}{2}-\frac{5}{2}}$
2778,48	2	{ 3,82 3,84	8,28 8,30	z ⁴ F°—e ⁴ D z ⁴ F°—e ⁴ D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2764,821	10	1,08	5,57	$a^{2}D-x^{2}D^{\circ}$	$\frac{5}{2}$ — $\frac{5}{2}$

λ, Ά	I	$E_{ m H}^{}$, eV	$E_{ m B}$, eV	Transition	J
2762 ,22 2761 ,291 2758 ,35	2 7 2	1,08 1,08 4,04	5,57 5,57 8,54	$a\ ^{2}D-x\ ^{2}D^{\circ}\ a\ ^{2}D-x\ ^{2}D^{\circ}\ z\ ^{4}D^{\circ}-f\ ^{4}F$	3/2 - 5/2 $3/2 - 3/2$ $3/2 - 5/2$
2757,62 2752,85 2751,70 2746,70 2742,30	3 4 50 30 8	4,05 4,06 3,86 3,87	8,55 8,56 8,41 8,38	$z^{4}D^{\circ} - f^{4}F$ $z^{4}D^{\circ} - f^{4}F$ $z^{4}F^{\circ} - e^{2}G$ $z^{2}F^{\circ} - e^{2}G$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \\ - \end{array} $
2738,70 2730,95 2725,79 2719,39 2717,304	3 6 3 2 3	2,06 2,05 1,12 1,08 1,13	6,59 6,59 5,66 5,64 5,69	$b\ ^{2}P-x\ ^{2}P^{\circ}\ b\ ^{2}P-x\ ^{2}P^{\circ}\ a\ ^{2}G-z\ ^{2}H^{\circ}\ a\ ^{2}D-y\ ^{2}P^{\circ}\ a\ ^{2}G-z\ ^{2}H^{\circ}$	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{3}{2} - \frac{1}{2} $ $ \frac{9}{2} - \frac{11}{2} $
2716,20 2698,52 2646,08 2642,15 2638,70	4 30 50 20 10	1,08 - 3,88 3,86 3,86 3,84	5,65 — 8,56 8,55 8,54	$a^{2}D-y^{2}P^{\circ} \\ - \\ z^{4}F^{\circ}-f^{4}F \\ z^{4}F^{\circ}-f^{4}F \\ z^{4}F^{\circ}-f^{4}F$	$\begin{array}{c} {}^{5/2}-{}^{3/2}\\ -\\ {}^{9/2}-{}^{9/2}\\ {}^{7/2}-{}^{7/2}\\ {}^{5/2}-{}^{5/2} \end{array}$
2635,60 2604,11 2572,648 2571,036 2555,988	5 2 5 20 10	3,82 0,13 0,57 0,57	8,53 4,89 — 5,43 5,42	$z^{4}F^{\circ}-f^{4}F \\ b^{4}F-y^{2}D^{\circ} \\ - \\ a^{2}F-y^{2}G^{\circ} \\ a^{2}F-y^{2}G^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ - \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array} $
2535,881 2534,640 2531,266 2525,619 2524,655	10 20 20 30 8	0,11 0,12 0,13 0,15 0,12	5,00 5,01 5,03 5,06 5,03	b 4F—y 4D° b 4F—y 4D° b 4F—y 4D° b 4F—y 4D° b 4F—y 4D° b 4F—y 4D°	3/2 - 1/2 $5/2 - 3/2$ $7/2 - 5/2$ $9/2 - 7/2$ $5/2 - 5/2$
2517 ,448 2510 ,90 2498 ,94 2478 ,64 2477 ,21	2 2 2 5 2	0,13 0,12 0,57 0,01 0,03	5,06 5,06 5,57 5,01 5,03	$b^{4}F-y^{4}D^{\circ} \\ b^{4}F-y^{4}D^{\circ} \\ a^{2}F-x^{2}D^{\circ} \\ a^{4}F-y^{4}D^{\circ} \\ a^{4}F-y^{4}D^{\circ}$	7/2 $5/2$ $7/2$ $7/2$ $7/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
2474,22 2450,44 2447,92 2442,67 2440,21	2 6 2 2 5	0,05 1,58 1,58 1,57 1,57	5,06 6,64 6,64 6,64 6,64	$egin{array}{cccccccccccccccccccccccccccccccccccc$	9/2 $-7/25/2$ $-5/25/2$ $-3/23/2$ $-5/23/2$ $-3/2$
2357 ,82 2355 ,17 2354 ,12 2350 ,67 2349 ,97	2 2 3 2 3	1,23 1,24 — 1,23 1,23	6,49 6,51 - 6,50 6,51	$b^{4}P - x^{4}D^{\circ}$ $b^{4}P - x^{4}D^{\circ}$ $ b^{4}P - x^{4}D^{\circ}$ $b^{4}P - x^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ - \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2347 ,46 2342 ,31 2341 ,23 2334 ,54 2269 ,14	2 3 3 3 3	1,22 1,89	6,50 _ 7,32	$b {}^{4}P - x {}^{4}D^{\circ}$ $ b {}^{2}G - w {}^{2}F^{\circ}$	1/2—3/2 — — — — 7/2—5/2
2261,23 2253,26 2250,09 2227,14 2162,68	3 2 2 2 2 4	1,89 3,09 3,12 1,08 1,24	7,37 8,60 8,63 6,64 6,97	$b\ ^2G-w\ ^2F^\circ\ c\ ^2D-v\ ^2D^\circ\ c\ ^2D-v\ ^2D^\circ\ a\ ^2D-w\ ^2D^\circ\ b\ ^4P-y\ ^4P^\circ$	$ \begin{array}{c} 9/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
2159,50 2159,09 2158,29 2155,58 2154,70	3 5 2 4 4	1,23 1,24 1,23 1,22 1,23	6,97 6,98 6,97 6,97 6,98	$b\ ^4P-y\ ^4P^\circ \ b\ ^4P-y\ ^4P^\circ \ b\ ^4P-y\ ^4P^\circ \ b\ ^4P-y\ ^4P^\circ \ b\ ^4P-y\ ^4P^\circ \ $	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
44 0					

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2054,54 2041,49 1909,74 1909,33 1908,29 1906,30	3 3 2 2 2 3 3	0,57 0,57 0,01 0,01 0,03 0,00	6,64 6,64 6,50 6,51 6,53 6,50	$a^{2}F - w^{2}D^{\circ}$ $a^{2}F - w^{2}D^{\circ}$ $a^{4}F - x^{4}D^{\circ}$	7/2 - 5/2 $5/2 - 3/2$ $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 5/2$ $7/2 - 7/2$ $3/2 - 3/2$

Ti III, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^6 \, 3d^2 \, ^3F_2$ Ionization potential 227 000 cm $^{-1}$; 28,143 eV

λ, Â	I	E_{H} , eV	$E_{\mathtt{B}},\ eV$	Transition	J
4215,55 4207,54 4204,95 4200,11 2984,76	5 3 2 2 10	 5,17	 9,32	$\begin{array}{c} - \\ - \\ - \\ - \\ - \\ - \\ b {}^{1}\!D - z {}^{1}\!D^{\circ} \end{array}$	
2819,02 2798,95 2798,73 2773,73 2718,64	1 1 0 1	5,17 5,17 5,17 5,17 4,76	9,57 9,60 9,60 9,64 9,32	$\begin{array}{c} b {}^{1}D - z {}^{3}D^{\circ} \\ b {}^{1}D - z {}^{3}F^{\circ} \\ b {}^{1}D - z {}^{3}D^{\circ} \\ b {}^{1}D - z {}^{3}F^{\circ} \\ a {}^{3}D - z {}^{1}D^{\circ} \end{array}$	2—2 2—2 2—3 2—3 3—2
2701,95 2692,15 2580,43 2576,43 2567,53	1 1 5 5 8	4,74 4,72 4,76 4,74 4,72	9,32 9,32 9,57 9,55 9,55	$a \ ^{3}D - z \ ^{1}D^{\circ}$ $a \ ^{3}D - z \ ^{1}D^{\circ}$ $a \ ^{3}D - z \ ^{3}D^{\circ}$	2-2 1-2 3-2 2-1 1-1
2565,42 2563,42 2556,58 2548,69 2548,55	8 15 1 1	4,74 4,76 4,72 4,74 4,74	9,57 9,60 9,57 9,60 9,60	a ³ D-z ³ D° a ³ D-z ³ D° a ³ D-z ³ F° a ³ D-z ³ F°	2-2 3-3 1-2 2-2 2-3
2547,98 2542,41 2540,02 2527,80 2516,01	0 1 15 15 20	5,17 4,76 4,72 4,74 4,76	10,03 9,64 9,60 9,64 9,69	b 1D-z 3P° a 3D-z 3F° a 3D-z 3F° a 3D-z 3F° a 3D-z 3F°	2-1 3-3 1-2 2-3 3-4
2413,97 2375,02 2346,78 2339,01 2334,33	15 6 6 5 3	5,17 5,17 4,76 4,74 4,74	10,30 10,39 10,05 10,03 10,05	$\begin{array}{c} b \ ^{1}D - z \ ^{1}F^{\circ} \\ b \ ^{1}D - z \ ^{1}P^{\circ} \\ a \ ^{3}D - z \ ^{3}P^{\circ} \\ a \ ^{3}D - z \ ^{3}P^{\circ} \\ a \ ^{3}D - z \ ^{3}P^{\circ} \end{array}$	2-3 2-1 3-2 2-1 2-2
2331,67 2331,35 2327,04 2237,82 2199,30	3 3 1 1	4,72 4,72 4,72 —	10,03 10,04 10,05 —	a 3D-z 3P° a 3D-z 3P° a 3D-z 3P° -	1-1 1-0 1-2 -
1957,02 1948,79 1941,40 1935,18 1929,34	0 5 4 3 1	9,69 9,69 9,64 9,60 10,05	16,02 16,05 16,02 16,00 16,47	$z \ ^{3}F^{\circ} - e \ ^{3}G$	4-4 4-5 3-4 2-3 2-1
1926 ,18 1901 ,31 1897 ,27	$\begin{matrix} 0 \\ 3 \\ 0 \end{matrix}$	10,03 9,60 9,57	16,47 16,12 16,10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 3-3 2-2

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λ, Λ	I	E _H , eV	$E_{_{ m B}},{ m eV}$	Transition	J
1832,21 1831,31	0	10,05 10,03	16,83 16,80	z ³ P°—e ³ P z ³ P°—e ³ P	2—1 1—0
1829,42 1828,14 1825,30 1811,09 1797,69	0 1 0 2 1	10,03 10,05 10,03 9,69 9,64	16,83 16,83 16,83 16,54 16,54	$z {}^{3}P^{\circ}-e {}^{3}P$ $z {}^{3}P^{\circ}-e {}^{3}P$ $z {}^{3}P^{\circ}-e {}^{3}F$ $z {}^{3}F^{\circ}-e {}^{3}F$	0, 1-1 $2-2$ $1-2$ $4-4$ $3-4$
1797,10 1792,56 1788,86 1787,32 1784,36	0 2 1 2 1	9,60 9,60 9,57 9,60 9,57	16,50 16,51 16,50 16,54 16,51	$z {}^{3}F^{\circ}-e {}^{3}F$ $z {}^{3}D^{\circ}-e {}^{3}F$ $z {}^{3}D^{\circ}-e {}^{3}F$ $z {}^{3}D^{\circ}-e {}^{3}F$ $z {}^{3}D^{\circ}-e {}^{3}F$	2—2 3—3 2—2 3—4 2—3
1783,58 1715,24 1506,07 1504,91 1504,59	1 0 10 5 10	9,55 9,60 1,31 1,33 1,31	16,50 16,83 9,55 9,57 9,55	$z {}^{3}D^{\circ}-e {}^{3}F$ $z {}^{3}D^{\circ}-e {}^{3}P$ $a {}^{3}P-z {}^{3}D^{\circ}$ $a {}^{3}P-z {}^{3}D^{\circ}$ $a {}^{3}P-z {}^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 3-2 \\ 1-1 \\ 2-2 \\ 0-1 \end{array} $
1502,36 1499,17 1498,65 1496,59 1495,08	10 20 30 1 1	1,31 1,33 1,05 1,31 1,74	9,57 9,60 9,32 9,60 10,03	$ \begin{array}{c} a \ {}^{3}P-z \ {}^{3}D^{\circ} \\ a \ {}^{3}P-z \ {}^{3}D^{\circ} \\ a \ {}^{1}D-z \ {}^{1}D^{\circ} \\ a \ {}^{3}P-z \ {}^{3}F^{\circ} \\ a \ {}^{1}S-z \ {}^{3}P^{\circ} \end{array} $	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-2 \\ 1-2 \\ 0-1 \end{array} $
1491,98 1455,22 1450,29 1433,85 1424,14	5 40 2 2 2	1,33 1,79 1,05 1,74 1,33	9,64 10,30 9,60 10,39 10,03	$a {}^{3}P-z {}^{3}F^{\circ}$ $a {}^{1}G-z {}^{1}F^{\circ}$ $a {}^{1}D-z {}^{3}D^{\circ}$ $a {}^{1}S-z {}^{1}P^{\circ}$ $a {}^{3}P-z {}^{3}P^{\circ}$	$egin{array}{c} 2-3 \\ 4-3 \\ 2-3 \\ 0-1 \\ 2-1 \\ \end{array}$
1422,41 1421,69 1420,42 1420,04 1339,72	25 20 15 15 2	1,33 1,31 1,31 1,31 1,05	10,05 10,03 10,03 10,05 10,30	$a \ ^{3}P - z \ ^{3}P^{\circ}$ $a \ ^{1}D - z \ ^{1}F^{\circ}$	$ \begin{array}{cccc} 2-2 \\ 1-0, & 1 \\ 0-1 \\ 1-2 \\ 2-3 \end{array} $
1327,60 1298,95 1298,67 1295,91 1294,67	15 40 50 30 50	$\begin{array}{c} 1,05 \\ 0,02 \\ 0,05 \\ 0,00 \\ 0,00 \\ 0,02 \end{array}$	10,39 9,57 9,60 9,55 9,57 9,60	$a\ ^{1}D-z\ ^{1}P^{\circ} \ a\ ^{3}F-z\ ^{3}D^{\circ} \ a\ ^{3}F-z\ ^{3}D^{\circ}$	2-1 3-2 4-3 2-1 2-2 3-2, 3
1293,26 1291,64 1289,32 1286,38 1282,49	30 20 30 40 3	0,05 0,00 0,02 0,05 0,02	9,64 9,60 9,64 9,69 9,69	$a\ ^{3}F-z\ ^{3}F^{\circ}\ a\ ^{3}F-z\ ^{3}F^{\circ}\ a\ ^{3}F-z\ ^{3}F^{\circ}\ a\ ^{3}F-z\ ^{3}F^{\circ}\ a\ ^{3}F-z\ ^{3}F^{\circ}$	4-3 2-2 3-3 4-4 3-4
1008,08 1007,15 1005,75 1004,68 1002,23	0 1 0 2 0	4,72 4,74 4,72 4,76 4,74	17,02 17,05 17,05 17,11 17,11	a ³ D-y ³ P° a ³ D-y ³ P° a ³ D-y ³ P° a ³ D-y ³ P° a ³ D-y ³ P°	1-0 $2-1$ $1-1$ $3-2$ $2-2$

Ti IV, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2 D_{3/2}$ Ionization potential 348 817,8 cm⁻¹; 43,245 eV

λ, Δ	I	$E_{_{ m H}}$, eV	EB, eV	Transition	J
5492,43 5398,82	6 8	26,33 26,33	28,59 28,63	5s ² S-5p ² P° 5s ² S-5p ² P°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
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λ, Α	I	E _H , eV	E _B , eV	Transition	J
4647,40 4403,54 4397,37	3 2 2	$ \left\{ \begin{array}{l} 34,53 \\ 34,53 \\ 29,27 \\ 29,28 \end{array} \right. $	37,19 37,19 32,09 32,10	$5g^{2}G-6h^{2}H^{\circ} \ 5g^{2}G-6h^{2}H^{\circ} \ 4f^{2}F^{\circ}-5d^{2}D \ 4f^{2}F^{\circ}-5d^{2}D$	$^{9/2}_{7/2}$ $^{11/2}_{7/2}$ $^{9/2}_{9/2}$ $^{5/2}_{3/2}$ $^{3/2}_{7/2}$
3576,44 3541,44 2957,50 2937,52 2930,14	4 3 4 5 1	28,63 28,59 24,40 24,41 24,40	32,10 32,09 28,59 28,63 28,63	$5p ^{2}P^{\circ} - 5d ^{2}D$ $5p ^{2}P^{\circ} - 5d ^{2}D$ $4d ^{2}D - 5p ^{2}P^{\circ}$ $4d ^{2}D - 5p ^{2}P^{\circ}$ $4d ^{2}D - 5p ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
2900,02 2862,67 2836,98 2547,30 2546,85	$egin{pmatrix} 0 \\ 1 \\ 0 \\ 3 \\ 12 \\ \end{smallmatrix}$	34,53 28,63 28,59 24,41 24,41	38,80 32,96 32,96 29,27 29,28	$5g^{2}G$ — $7h^{2}H$ $5p^{2}P^{\circ}$ — $6s^{2}S$ $5p^{2}P^{\circ}$ — $6s^{2}S$ $4d^{2}D$ — $4f^{2}F^{\circ}$ $4d^{2}D$ — $4f^{2}F^{\circ}$	$\begin{array}{c} -\\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 5/_2 - 5/_2 \\ 5/_2 - 7/_2 \end{array}$
2541,75 2359,51 2359,11 2103,08 2067,50	8 5 5 10 15	24,40 29,28 29,27 9,97 9,97	29,27 34,53 34,53 15,86 15,96	$4d\ ^2D-4f\ ^2F^\circ \ 4f\ ^2F^\circ-5g\ ^2G \ 4f\ ^2F^\circ-5g\ ^2G \ 4s\ ^2S-4p\ ^2P^\circ \ 4s\ ^2S-4p\ ^2P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1469,21 1467,25 1451,75 1195,25 1183,63	15 30 30 5 5	15,96 15,96 15,86 15,96 15,86	24,40 24,41 24,40 26,33 26,33	$4p \ ^{2}P^{\circ}$ — $4d \ ^{2}D$ $4p \ ^{2}P^{\circ}$ — $4d \ ^{2}D$ $4p \ ^{2}P^{\circ}$ — $4d \ ^{2}D$ $4p \ ^{2}P^{\circ}$ — $5s \ ^{2}S$ $4p \ ^{2}P^{\circ}$ — $5s \ ^{2}S$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
781,78 779,14 776,82 729,39 424,28 423,58	20 20 10 0 3 4	0,00 0,05 0,00 15,96 0,05 0,05	15,86 15,96 15,96 32,96 29,28 29,27	$3d^{2}D-4p^{2}P^{\circ} \ 3d^{2}D-4p^{2}P^{\circ} \ 3d^{2}D-4p^{2}P^{\circ} \ 4p^{2}P^{\circ}-6s^{2}S \ 3d^{2}D-4f^{2}F^{\circ} \ 3d^{2}D-4f^{2}F^{\circ}$	$ \begin{array}{c} 3/_2 - 1/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 5/_2 - 7/_2 \\ 5/_2 - 5/_2 \end{array} $

Ti V, ground state $1s^2 2s^2 2p^6 3s^2 3p^{6 1}S_0$ Ionization potential 805 500 cm⁻¹; 99,864 eV

λ, Α	I	E_{H} , eV	E _B , eV	Transition	J
228,898	75	0,00	54,16	$3p^{6} ^{1}S - 4s ^{3}P^{\circ}$	0—1
225,337	100	0,00	55,02	$3p^{6} ^{1}S - 4s ^{1}P^{\circ}$	0—1
164,450	6	0,00	75,39	$3p^{6} ^{1}S - 5s ^{3}P^{\circ}$	0—1
163,140	5	0,00	75,99	$3p^{6} ^{1}S - 5s ^{1}P^{\circ}$	0—1

Ti VI, ground state $1s^2 2s^2 2p^6 3s^2 3p^{5 2} P^0_{3/2}$ Ionization potential 966 000 cm⁻¹; 119,762 eV

λ, Α	I	$E_{\rm H}$, eV	E _H , eV	Transition	J
524,11 508,58 201,862 201,313 199,759	10 12 5 5	0,72 0,00 0,00 0,72 0,72	24,38 24,38 61,42 62,31 62,79	$3p^{5} {}^{2}P^{\circ} - 3p^{6} {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 3p^{6} {}^{2}S$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{4}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$	1/2 - 1/2 $3/2 - 1/2$ $3/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$

λ, Α	Ι	$E_{\rm H}$, eV	E _B , eV	Transition	j
198,974 197,455 194,900 192,747 192,705	8 5 7 8 1	0,00 0,00 0,72 0,00 0,00	62,31 62,79 64,32 64,32 64,34	$3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 4s {}^{2}P$ $3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$ $3p^{5} {}^{2}P^{\circ} - 4s' {}^{2}D$	3/2 - 3/2 $3/2 - 1/2$ $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 3/2$
184,104 182,148	4 5	$\begin{array}{c} 0,72 \\ 0.00 \end{array}$	68,06 68,06	3p ⁵ ² P°—4s" ² S 3p ⁵ ² P°—4s" ² S	$^{1}/_{2}$

Fe I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2 {}^5D_4$ Ionization potential $63\,700$ cm⁻¹; 7,897 eV

λ, Α	I	E _H , eV	E_{B} , eV	Transition	J
11973,067 11882,861 11783,275 11689,988 11638,279	8 7 6 8 7	2,18 2,20 2,83 2,22 2,18	3,21 3,24 3,88 3,28 3,24	$a {}^{5}P - z {}^{5}D^{\circ}$ $a {}^{5}P - z {}^{5}D^{\circ}$ $b {}^{3}P - z {}^{3}D^{\circ}$ $a {}^{5}P - z {}^{5}D^{\circ}$ $a {}^{5}P - z {}^{5}D^{\circ}$	3-4 2-3 2-3 1-1 3-3
11593,600 11439,129 11422,335 11119,809 10863,60	5 15 6 10 5	2,22 2,84 2,20 2,84 4,73	3,29 3,92 3,28 3,95 5,87	$a {}^{5}P - z {}^{5}D^{\circ}$ $b {}^{3}P - z {}^{3}D^{\circ}$ $a {}^{5}P - z {}^{5}D^{\circ}$ $b {}^{3}P - z {}^{3}D^{\circ}$ $y {}^{3}D^{\circ} - e {}^{5}F$	1-0 1-2 2-1 1-1 3-4
10532,21 10469,59 10395,811 10216,351 10145,601	10 20 8 100 80	3,93 3,89 2,18 4,73 4,79	5,10 5,07 3,36 5,94 6,01	$z {}^{3}D^{\circ} - X$ $z {}^{3}D^{\circ} - X$ $a {}^{5}P - z {}^{5}F^{\circ}$ $y {}^{3}D^{\circ} - e {}^{3}F$ $y {}^{3}D^{\circ} - e {}^{3}F$	$ \begin{array}{r} 2-2 \\ 3-3 \\ 3-4 \\ 3-4 \\ 2-3 \end{array} $
10065,080 9889,082 9861,793 9800,335 9763,913	60 40 30 20 15	4,83 5,03 5,06 5,08 5,03	6,06 6,28 6,31 6,34 6,30	$y \ ^{3}D^{\circ}-e \ ^{3}F$ $x \ ^{5}F^{\circ}-e \ ^{5}G$ $x \ ^{5}F^{\circ}-e \ ^{5}G$ $x \ ^{5}F^{\circ}-e \ ^{5}G$ $x \ ^{5}F^{\circ}-e \ ^{7}F$	1-2 $4-5$ $3-4$ $2-3$ $4-5$
9763,450 9738,624 9653,143 9626,562 9569,960	15 200 20 30 40	5,10 4,98 4,73 5,03 4,99	6,38 6,26 6,01 6,31 6,28	$x {}^{5}F^{\circ}-e {}^{5}G$ $x {}^{5}F^{\circ}-e {}^{5}G$ $y {}^{3}D^{\circ}-e {}^{3}F$ $x {}^{5}F^{\circ}-e {}^{5}G$ $x {}^{5}F^{\circ}-e {}^{5}G$	1—2 5—6 3—3 4—4 5—5
9414,14 9372,904 9350,44 9259,05 9258,31	20 6 10 15 20	5,06 2,56 4,56 4,91 4,56	6,37 3,87 5,87 6,24 5,94	$x^{5}F^{\circ}-f^{5}F$ $b^{3}F-z^{3}F^{\circ}$ $y^{3}F^{\circ}-e^{5}F$ $x^{5}D^{\circ}-f^{5}D$ $y^{3}F^{\circ}-e^{3}F$	3-4 4-4 4-4 3-4
9210,033 9118,892 9089,415 9088,324 9079,599	6 25 30 50 8	2,85 2,84 2,96 2,85 4,65	4,19 4,19 4,31 4,21 6,01	$b\ ^{3}P-y\ ^{5}D^{\circ}\ b\ ^{3}P-y\ ^{5}D^{\circ}\ b\ ^{3}G-z\ ^{5}G^{\circ}\ b\ ^{3}P-z\ ^{3}P^{\circ}\ y\ ^{3}F^{\circ}-e\ ^{3}F$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 5-5 \\ 1-2 \\ 2-3 \end{array} $
9024,47 9012,098 8999,564 8975,408 8945,204	15 30 200 10 20	4,91 4,99 2,83 2,99 5,03	6,28 6,36 4,21 4,37 6,41	$x {}^{5}D^{\circ} - e {}^{5}G$ $x {}^{5}F^{\circ} - g {}^{5}D$ $b {}^{3}P - z {}^{3}P^{\circ}$ $b {}^{3}G - z {}^{5}G^{\circ}$ $x {}^{5}F^{\circ} - g {}^{5}D$	4—5 5—4 2—2 4—4 4—3
8866,961 8838,433 8824,227 8804,624 8793,376	150 30 250 10 120	4,55 2,87 2,20 2.29 4,61	5,94 4,26 3,60 3,69 6,01	$y \ ^{3}F^{\circ}-e \ ^{3}F \\ b \ ^{3}P-z \ ^{3}P^{\circ} \\ a \ ^{5}P-z \ ^{5}P^{\circ} \\ a \ ^{3}P-z \ ^{5}P^{\circ} \\ y \ ^{3}F^{\circ}-e \ ^{3}F$	4-4 0-1 2-3 2-1 3-3
8764,00 8757,192 8710,29 8688,632 8674,751	100 25 20 1500 60	4,65 2,85 4,91 2,18 2,84	6,06 4,26 6,33 3,60 4,26	$y \ ^{3}F^{\circ}-e \ ^{3}F \\ b \ ^{3}P-z \ ^{3}P^{\circ} \\ x \ ^{5}D^{\circ}-f \ ^{5}F \\ a \ ^{5}P-z \ ^{5}P^{\circ} \\ b \ ^{3}P-z \ ^{3}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 4-1 \\ 4-5 \\ 3-3 \\ 2-1 \end{array} $
8661,907 8621,612 8611,807	600 10 40	2,22 2,96 2,85	3,65 4,39 4,29	a ⁵ P-z ⁵ P° b ³ G-z ³ G° b ³ P-z ³ P°	1-2 5-5 1-0

I	E _H , eV	E _B , eV	Transition	J
15	3,00	4,44	$b\ {}^{3}G-z\ {}^{3}G^{\circ}\ b\ {}^{3}G-z\ {}^{3}G^{\circ}$	4-4
20	3,02	4,47		3-3
$ \begin{array}{c} 150 \\ 300 \\ 20 \\ 1200 \\ 25 \end{array} $	2,20 2,23 4,56 2,18 3,26	3,65 3,68 6,01 3,65 4,73	$a\ ^{5}P-z\ ^{5}P^{\circ}\ a\ ^{5}P-z\ ^{5}P^{\circ}\ y\ ^{3}F^{\circ}-e\ ^{3}F\ a\ ^{5}P-z\ ^{5}P^{\circ}\ a\ ^{3}D-y\ ^{3}D^{\circ}$	2-2 1-1 4-3 3-2 3-3
80	4,45	5,92	$z \ {}^{3}G^{\circ} - e \ {}^{5}F$	4-3
200	4,40	5,87	$z \ {}^{3}G^{\circ} - e \ {}^{5}F$	5-4
1200	2,20	3,68	$a \ {}^{5}P - z \ {}^{5}P^{\circ}$	2-1
20	3,31	4,79	$a \ {}^{3}D - y \ {}^{3}D^{\circ}$	2-2
30	4,38	5,88	$z \ {}^{5}G^{\circ} - e \ {}^{5}F$	4-4
8	2,43	3,93	$a\ ^{3}P-z\ ^{3}D^{\circ} \ z\ ^{5}G^{\circ}-e\ ^{5}F \ z\ ^{5}G^{\circ}-e\ ^{5}F \ z\ ^{3}G^{\circ}-e\ ^{3}F$	1—2
50	4,42	5,92		3—3
150	4,32	5,82		6—5
40	4,45	5,97		2—2
80	4,43	5,94		4—4
200	4,45	5,97	$z {}^{5}G^{\circ} - e {}^{5}F$ $a {}^{5}F - z {}^{7}D^{\circ}$ $z {}^{5}G^{\circ} - e {}^{5}F$ $z {}^{3}G^{\circ} - e {}^{3}F$ $z {}^{5}G^{\circ} - e {}^{5}F$	2—1
15	0,87	2,40		5—5
600	4,42	5,95		3—2
50	4,47	6,01		3—3
700	4,37	5,92		4—3
20 600 10 700 6	4,39 3,28 4,31 0,86	5,94 4,83 5,87 2,42	$z \ ^{3}G^{\circ}-e \ ^{3}F \\ a \ ^{3}D-y \ ^{3}D^{\circ} \\ z \ ^{5}G^{\circ}-e \ ^{5}F \\ a \ ^{5}F-z \ ^{7}D^{\circ}$	 54 11 54 54
400	4,44	6,01	$z\ {}^3G^{\circ}-e\ {}^3F$ $ z\ {}^3G^{\circ}-e\ {}^3F$ $b\ {}^3G-y\ {}^3F^{\circ}$ $y\ {}^5F^{\circ}-e\ {}^5F$	4—3
6				—
300	4,48	6,06		3—2
125	2,96	4,55		5—4
25	4,22	5,82		4—5
80	3,01	4,61	$b\ ^{3}G-y\ ^{3}F^{\circ}$ $y\ ^{5}F^{\circ}-e\ ^{5}F$ $y\ ^{3}D^{\circ}-e\ ^{3}D$ $y\ ^{3}D^{\circ}-e\ ^{3}D$ $z\ ^{5}G^{\circ}-e\ ^{3}F$	4-3
30	4,26	5,87		3-4
6	4,80	6,42		2-2
25	4,73	6,36		3-3
150	4,31	5,94		5-4
50	3,02	4,65	$b\ {}^3G - y\ {}^3F^\circ \ y\ {}^5F^\circ - e\ {}^5F \ z\ {}^5G^\circ - e\ {}^3F \ y\ {}^5F^\circ - e\ {}^5F \ z\ {}^5G^\circ - e\ {}^3F$	3-2
30	4,28	5,92		2-3
60	4,37	6,01		4-3
800	4,18	5,82		5-5
8	4,42	6,06		3-2
400	4,22	5,87	$y \ ^{5}F^{\circ}-e \ ^{5}F$	4-4
12	4,30	5,95		1-2
200	4,26	5,92		3-3
100	4,28	5,95		2-2
80	4,30	5,97		1-1
8	4,91	6,59	$x {}^{5}D^{\circ} - f {}^{5}P$ $y {}^{5}F^{\circ} - e {}^{5}F$ $y {}^{5}F^{\circ} - e {}^{5}F$ $z {}^{3}P^{\circ} - e {}^{5}F$ $c {}^{3}P - y {}^{3}D^{\circ}$	4-3
15	4,25	5,95		3-2
10	4,22	5,92		4-3
8	4,22	5,92		2-3
12	3,02	4,73		2-3
500	4,15	5,87	$y \ ^5D^{\circ}-e \ ^5F$ $y \ ^5D^{\circ}-e \ ^5F$ $y \ ^5D^{\circ}-y \ ^5F$ $y \ ^5D^{\circ}-e \ ^5F$ $y \ ^5D^{\circ}-e \ ^5F$	3-4
800	4,10	5,82		4-5
250	4,19	5,92		2-3
150	4,22	5,95		1-2
40	4,23	5,97		0-1
	15 20 150 300 20 1200 25 80 200 1200 25 80 200 150 600 15 600 700 6 400 6 300 125 25 80 30 60 800 80 8 400 12 200 100 80 80 8 15 10 8 12 500 800 250 150	15 3,00 20 3,02 150 2,20 300 2,23 20 4,56 1200 2,18 25 3,26 80 4,45 200 4,40 1200 2,20 20 3,31 30 4,38 8 2,43 50 4,42 150 4,32 40 4,45 80 4,43 200 4,45 80 4,47 700 4,37 20 — 600 4,39 10 3,28 700 4,31 6 0,86 400 4,44 6 — 300 4,48 125 2,96 25 4,22 80 3,01 30 4,26 6 4,80 25 4,73 150 4,31 50 3,02 30 4,28 60 4,37 80 4,18 8 4,42 400 4,22 12 4,30 200 4,28 80 4,30 8 4,91 15 4,25 10 4,26 10 4,28 80 4,30 8 4,91 15 4,25 10 4,22 12 3,02 500 4,15 800 4,10 250 4,19 150 4,22	15	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
7068,413 7038,251 7024,649 7022,976 7016,436	40 40 10 50 60	4,08 4,22 4,57 4,19 4,15	5,82 5,97 6,33 5,96 5,92	$c\ ^3F - w\ ^3D^{\circ}$ $y\ ^5D^{\circ} - e\ ^5F$ $y\ ^5P^{\circ} - f\ ^7D$ $y\ ^5D^{\circ} - e\ ^5F$ $y\ ^5D^{\circ} - e\ ^5F$	4-3 1-1 3-2 2-2 3-3
7016,075 6999,902 6978,856 6951,261 6945,208	20 30 100 25 150	2,42 4,10 2,49 4,56 2,43	4,19 5,87 4,26 6,34 4,21	$a\ ^{3}P-y\ ^{5}D^{\circ}$ $y\ ^{5}D^{\circ}-e\ ^{5}F$ $a\ ^{3}P-z\ ^{3}P^{\circ}$ $y\ ^{5}P^{\circ}-e\ ^{7}F$ $a\ ^{3}P-z\ ^{3}P^{\circ}$	$ \begin{array}{r} 1-2 \\ 4-4 \\ 0-1 \\ 3-3 \\ 1-2 \end{array} $
6916,702 6885,77 6858,164 6855,179 6843,671	60 20 40 150 60	4,16 4,65 4,62 4,56 4,55	5,94 6,44 6,42 6,37 6,36	$y \ ^{5}D^{\circ}-e \ ^{3}F$ $y \ ^{3}F^{\circ}-e \ ^{3}D$ $y \ ^{3}F^{\circ}-e \ ^{3}D$ $y \ ^{5}P^{\circ}-e \ ^{5}D$ $y \ ^{3}F^{\circ}-e \ ^{3}D$	3-4 2-1 3-2 3-4 4-3
6841,349 6828,610 6810,25 6806,851 6750,155	80 50 20 10 100	4,61 4,64 4,61 2,73 2,42	6,42 6,46 6,43 4,55 4,26	y ⁵ P°-g ⁵ D y ⁵ P°-g ⁵ D y ⁵ P°-e ⁵ P a ³ G-y ³ F° a ³ P-z ³ P°	2-3 1-2 2-3 4-4 1-1
6726,478 6705,117 6703,574 6677,994 6663,444	20 15 10 600 80	4,62 4,62 2,77 2,70 2,43	6,45 6,46 4,61 4,55 4,29	y ⁵ P°-e ⁵ P y ⁵ P°-e ⁵ P a ³ G-y ³ F° a ³ G-y ³ F° a ³ P-z ³ P°	2-1 2-2 3-3 5-4 1-0
6633,772 6609,117 6597,607 6593,875 6592,920	50 30 15 60 300	4,56 2,57 4,80 2,43 2,73	6,43 4,44 6,68 4,31 4,61	$y \ ^{5}P^{\circ}-e \ ^{5}P$ $b \ ^{3}F-z \ ^{3}G^{\circ}$ $y \ ^{3}D^{\circ}-g \ ^{5}F$ $a \ ^{3}H-z \ ^{5}G^{\circ}$ $a \ ^{3}G-y \ ^{3}F^{\circ}$	3—3 4—4 2—3 5—5 4—3
6575,024 6569,224 6546,245 6518,374 6498,950	$30 \\ 50 \\ 200 \\ 20 \\ 5$	2,59 4,73 2,76 2,84 0,96	4,47 6,62 4,65 4,73 2,86	$\begin{array}{c} b \ ^{3}F - z \ ^{3}G^{\circ} \\ y \ ^{3}D^{\circ} - g \ ^{5}F \\ a \ ^{3}G - y \ ^{3}F^{\circ} \\ b \ ^{3}P - y \ ^{3}D^{\circ} \\ a \ ^{5}F - z \ ^{7}F^{\circ} \end{array}$	3-3 3-4 3-2 2-3 3-3
6496,456 6494,985 6481,877 6475,632 6469,214	20 1000 20 12 15	4,79 2,40 2,28 2,56 4,84	6,70 4,31 4,19 4,47 6,75	$y \ ^{3}D^{\circ} - f \ ^{3}D$ $a \ ^{3}II - z \ ^{5}G^{\circ}$ $a \ ^{3}P - y \ ^{5}D^{\circ}$ $b \ ^{3}F - z \ ^{3}G^{\circ}$ $y \ ^{3}D^{\circ} - f \ ^{3}D$	$ \begin{array}{r} 2-2 \\ 6-5 \\ 2-2 \\ 4-3 \\ 1-1 \end{array} $
6462,730 6430,852 6421,355 6419,977 6411,659	30 300 200 30 400	2,46 2,19 2,28 4,74 3,65	4,37 4,11 4,21 6,67 5,58	$a \ ^{3}H-z \ ^{5}G^{\circ}$ $a \ ^{5}P-y \ ^{5}D^{\circ}$ $a \ ^{3}P-z \ ^{3}P^{\circ}$ $y \ ^{3}D^{\circ}-f \ ^{3}D$ $z \ ^{5}P^{\circ}-e \ ^{5}D$	4-4 $3-4$ $2-2$ $3-3$ $2-3$
6408,028 6400,013 6393,605 6335,335 6318,022	60 800 400 10 10	3,68 3,60 2,43 2,21 2,46	5,62 5,54 4,37 4,16 4,42	$z ext{ }^{5}P^{\circ} - e ext{ }^{5}D$ $z ext{ }^{5}P^{\circ} - e ext{ }^{5}D$ $a ext{ }^{3}H - z ext{ }^{5}G^{\circ}$ $a ext{ }^{5}P - y ext{ }^{5}D^{\circ}$ $a ext{ }^{3}H - z ext{ }^{5}G^{\circ}$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 5-4 \\ 2-3 \\ 4-3 \end{array} $
6301,510 6254,263 6252,561 6246,329 6230,728	15 6 20 15 25	3,66 2,29 2,40 3,61 2,57	5,62 4,26 4,39 5,58 4,55	$z {}^{5}P^{\circ} - e {}^{5}D$ $a {}^{3}P - z {}^{3}P^{\circ}$ $a {}^{3}H - z {}^{3}G^{\circ}$ $z {}^{5}P^{\circ} - e {}^{5}D$ $b {}^{3}F - y {}^{3}F^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 6-5 \\ 3-3 \\ 4-4 \end{array} $
6191,561 6137,697 6136,621	20 18 20	2,44 2,60 2,45	4,44 4,61 4,47	$a \ ^{3}H-z \ ^{3}G^{\circ}$ $b \ ^{3}F-y \ ^{3}F^{\circ}$ $a \ ^{3}H-z \ ^{3}G^{\circ}$	5-4 3-3 4-3

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λ, λ	I	$E_{ m H},\;{ m eV}$	E _B . eV	Transition	J
6065,487 6024,063	15 15	2,62 4,56	4,65 6,61	b ³ F—y ³ F° y ³ F°—f ⁵ G	2—2 4—5
6020,479 6016,655 6008,576 6003,034 5987,055	10 5 9 8 6	4,61 3,54 3,88 3,88 4,80	6,67 5,60 5,94 5,94 6,87	$y {}^{3}F^{\circ} - f {}^{5}G$ $a {}^{1}D - x {}^{3}D^{\circ}$ $z {}^{3}D^{\circ} - e {}^{3}F$ $z {}^{3}F^{\circ} - e {}^{3}F$ $y {}^{3}D^{\circ} - e {}^{3}P$	3-4 2-3 3-4 4-4 2-1
5984,804 5983,704 5930,186 5914,162 5862,363	8 6 8 8	4,73 4,55 4,66 4,62 4,55	6,80 6,62 6,74 6,70 6,65	$y \ ^{3}D^{\circ}-e \ ^{3}P$ $y \ ^{3}F^{\circ}-g \ ^{5}F$ $y \ ^{3}F^{\circ}-e \ ^{3}G$ $y \ ^{3}F^{\circ}-f \ ^{3}D$ $y \ ^{3}F^{\circ}-e \ ^{3}G$	3-2 4-4 2-3 3-2 4-5
5763,013 5753,136 5709,3864 5701,551 5662,525	10 5 10 7 6	4,21 4,26 3,37 2,56 4,19	6,35 6,42 5,54 4,73 6,37	$z \ ^{3}P^{\circ}-e \ ^{3}D$ $z \ ^{3}P^{\circ}-e \ ^{3}D$ $z \ ^{5}F^{\circ}-e \ ^{5}D$ $b \ ^{3}F-y \ ^{3}D^{\circ}$ $y \ ^{5}F^{\circ}-g \ ^{5}D$	2-3 1-2 4-4 4-3 5-4
5658,8247 5624,5501 5615,6521 5602,9529 5586,7634	10 10 50 10 40	3,40 3,42 3,33 3,43 3,37	5,58 5,62 5,54 5,64 5,58	$z {}^{5}F^{\circ} - e {}^{5}D$	$ \begin{array}{r} 3-3 \\ 2-2 \\ 5-4 \\ 1-1 \\ 4-3 \end{array} $
5576,106 5572,8501 5569,6256 5563,604 5554,887	10 30 20 5 5	3,43 3,40 3,42 4,19 4,55	5,65 5,62 5,64 6,42 6,78	$z {}^{5}F^{\circ} - e {}^{5}D$ $z {}^{5}F^{\circ} - e {}^{5}D$ $z {}^{5}F^{\circ} - e {}^{5}D$ $y {}^{5}D^{\circ} - g {}^{5}D$ $y {}^{3}F^{\circ} - f {}^{3}F$	$ \begin{array}{r} 1 - 0 \\ 3 - 2 \\ 2 - 1 \\ 2 - 3 \\ 4 - 4 \end{array} $
5506 ,7824 5501 ,4686 5497 ,5196 5487 ,138 5476 ,571	18 12 15 8 10	0,99 0,95 1,01 4,14 4,10	3,24 3,21 3,26 6,40 6,36	$a ^{5}F-z ^{5}D^{\circ}$ $a ^{5}F-z ^{5}D^{\circ}$ $a ^{5}F-z ^{5}D^{\circ}$ $c ^{3}F-t ^{5}D^{\circ}$ $y ^{5}D^{\circ}-g ^{5}D$	$ \begin{array}{r} 2 - 3 \\ 3 - 4 \\ 1 - 2 \\ 3 - 2 \\ 4 - 4 \end{array} $
5473,920 5463,283 5455,6131 5446,920 5445,037	5 10 40 40 15	4,16 4,47 1,01 0,99 4,39	6,42 6,70 3,28 3,26 6,66	$y {}^{5}D^{\circ} - g {}^{5}D$ $z {}^{3}G^{\circ} - e {}^{3}G$ $a {}^{5}F - z {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$ $z {}^{3}G^{\circ} - e {}^{3}G$	$ \begin{array}{r} 3 - 3 \\ 4 - 4 \\ 1 - 1 \\ 2 - 2 \\ 5 - 5 \end{array} $
5434,5268 5429,6999 5424,076 5415,207 5410,909	30 40 45 35 15	1,01 0,96 4,32 4,39 4,47	3,29 3,24 6,61 6,68 6,76	$a\ ^{5}F-z\ ^{5}D^{\circ}\ a\ ^{5}F-z\ ^{5}D^{\circ}\ z\ ^{5}G^{\circ}-e\ ^{5}H\ z\ ^{3}G^{\circ}-e\ ^{3}H\ z\ ^{3}G^{\circ}-e\ ^{3}H$	$ \begin{array}{r} 1 - 0 \\ 3 - 3 \\ 6 - 7 \\ 5 - 6 \\ 3 - 4 \end{array} $
5405 ,7781 5404 ,148 5400 ,503 5397 ,1311 5393 ,1752	40 30 5 40 10	0,99 4,44 4,37 0,91 3,24	3,28 6,73 6,67 3,21 5,54	$a^{5}F-z^{5}D^{\circ}$ $z^{3}G^{\circ}-e^{3}H$ $z^{5}G^{\circ}-f^{5}G$ $a^{5}F-z^{5}D^{\circ}$ $z^{5}D^{\circ}-e^{5}D$	2—1 4—5 4—4 4—4 3—4
5383,371 5371,4926 5369,957 5367,460 5364,883	35 50 25 20 15	4,31 0,96 4,37 4,42 4,45	6,62 3,26 6,68 6,73 6,76	$z {}^{5}G^{\circ} - e {}^{5}H$ $a {}^{5}F - z {}^{5}D^{\circ}$ $z {}^{5}G^{\circ} - e {}^{5}H$ $z {}^{5}G^{\circ} - e {}^{5}H$ $z {}^{5}G^{\circ} - e {}^{5}H$	5-6 3-2 4-5 3-4 2-3
5341,0255 5339,9371 5328,5336 5328,0418 5324,182	20 12 15 50 30	1,61 3,26 1,56 0,91 3,21	3,92 5,58 3,88 3,24 5,54	$a \ ^{3}F - z \ ^{3}D^{\circ}$ $z \ ^{5}D^{\circ} - e \ ^{5}D$ $a \ ^{3}F - z \ ^{3}D^{\circ}$ $a \ ^{5}F - z \ ^{5}D^{\circ}$ $z \ ^{5}D^{\circ} - e \ ^{5}D$	2-2 2-3 3-3 4-3 4-4
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λ, Å	I	E _H , eV	$E_{\mathrm{B}},~\mathrm{eV}$	Transition	J
5307,3633 5302,3073 5283,6283 5281,7970 5270,3602	5 10 18 10 30	1,61 3,28 3,25 3,04 1,61	3,95 5,62 5,59 5,38 3,96	$a \ {}^{3}F - z \ {}^{3}F^{\circ}$ $z \ {}^{5}D^{\circ} - e \ {}^{5}D$ $z \ {}^{5}D^{\circ} - e \ {}^{5}D$ $z \ {}^{7}P^{\circ} - e \ {}^{7}D$ $a \ {}^{3}F - z \ {}^{3}D^{\circ}$	2-3 1-2 3-3 2-3 2-1
5269,5402 5266,564 5263,3134 5250,6490 5242,4955	60 30 8 6 5	0,86 3,00 3,26 2,20 3,63	3,21 5,35 5,62 4,56 5,99	$a {}^{5}F - z {}^{5}D^{\circ}$ $z {}^{7}P^{\circ} - e {}^{7}D$ $z {}^{5}D^{\circ} - e {}^{5}D$ $a {}^{5}P - y {}^{5}P^{\circ}$ $a {}^{1}I - z {}^{1}H^{\circ}$	5-4 3-4 2-2 2-3 6-5
5232,9474 5227,1911 5226,8686 5217,3964 5216,2770	40 40 15 5 10	2,94 1,55 3,04 3,21 1,61	5,31 3,92 5,41 5,58 3,99	$z^{7}P^{\circ}-e^{7}D$ $a^{3}F-z^{3}D^{\circ}$ $z^{7}P^{\circ}-e^{7}D$ $z^{5}D^{\circ}-e^{5}D$ $a^{3}F-z^{3}F^{\circ}$	4-5 3-2 2-2 4-3 2-2
5215,1871 5208,6007 5204,5840 5202,3395 5195,478	6 7 5 8 8	3,26 3,24 0,09 2,18 4,22	5,64 5,62 2,47 4,56 6,61	$ \begin{array}{ccccccccccccccccccccccccccccccccccc$	2-1 3-2 2-2 3-3 4-5
5194,9441 5192,3509 5191,4615 5171,5987 5167,4905	10 30 '20 20 40	1,56 3,00 3,03 1,48 1,48	3,95 5,38 5,42 3,88 3,89	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3-3 3-3 2-1 4-4 4-3
5166,2841 5162,288 5150,8425 5142,9320 5139,4702	$\frac{6}{20}$	0,00 4,18 0,99 0,95 2,94	2,40 6,58 3,39 3,36 5,35	$a ^{5}D - z ^{7}D^{\circ}$ $y ^{5}F^{\circ} - g ^{5}F$ $a ^{5}F - z ^{5}F^{\circ}$ $a ^{5}F - z ^{5}F^{\circ}$ $z ^{7}P^{\circ} - e ^{7}D$	4—5 5—5 2—3 3—4 4—4
5139,2578 5137,388 5133,680 5127,3624 5125,130	$\begin{array}{c} 6 \\ 20 \end{array}$	3,00 4,17 4,17 0,91 4,22	5,41 6,59 6,59 3,33 6,64	$z^{7}P^{\circ}-e^{7}D$ $y^{5}F^{\circ}-h^{5}D$ $y^{5}F^{\circ}-f^{5}G$ $a^{5}F-z^{5}F^{\circ}$ $y^{5}F^{\circ}-h^{5}D$	3-2 5-4 5-6 4-5 4-3
5123,7231 5110,4139 5107,4505 5098,7030 5096,995	6	1,01 0,00 0,99 2,18 4,28	3,43 2,42 3,41 4,61 6,72	$a \ ^{5}F - z \ ^{5}F^{\circ}$ $a \ ^{5}D - z \ ^{7}D^{\circ}$ $a \ ^{5}F - z \ ^{5}F^{\circ}$ $a \ ^{5}P - y \ ^{5}P^{\circ}$ $y \ ^{5}F^{\circ} - f \ ^{5}G$	1-1 4-4 2-2 3-2 2-3
5090 ,789 5083 ,3413 5074 ,760 5068 ,7730 5065 ,016	10	4,25 0,95 4,22 2,94 4,26	6,69 3,39 6,66 5,38 6,70	$y {}^{5}F^{\circ} - h {}^{5}D \ a {}^{5}F - z {}^{5}F^{\circ} \ y {}^{5}F^{\circ} - e {}^{3}G \ z {}^{7}P^{\circ} - e {}^{7}D \ y {}^{5}F^{\circ} - e {}^{3}G$	3-2 3-3 4-5 4-3 3-4
5051,6379 5049,8253 5041,7585 5041,0747 5036,294	3 15 5 10	0,91 2,28 1,48 0,95	3,36 4,73 3,94 3,41	a ⁵ F-z ⁵ F° a ³ P-y ³ D° a ³ F-z ³ F° a ⁵ F-z ⁵ F°	4-4 2-3 4-3 3-2
5031,901 5028,131 5022,250 5014,959 5012,0712	8 4 6 10 2 12	4,37 3,57 3,98 3,94 0,86	6,83 6,03 6,44 6,41 3,33	$z {}^{5}G^{\circ} - f {}^{3}F$ $a {}^{1}H - y {}^{1}G^{\circ}$ $z {}^{3}F^{\circ} - e {}^{3}D$ $z {}^{3}F^{\circ} - e {}^{3}D$ $a {}^{5}F - z {}^{5}F^{\circ}$	4-3 5-4 2-1 3-2 5-5
5006 ,125 ² , 5005 ,725 ,7005 ,7998	10	2,83 3,88 3,39	5,30 6,35 5,87	$z {}^{7}F^{\circ} - e {}^{7}D$ $z {}^{3}D^{\circ} - e {}^{3}D$ $z^{5} F^{\circ} - e {}^{5}F$	5—5 3—3 3—4

λ, Α	I	E _H , eV	E _B , eV	Transition	J
5001 ,871	12	3,88	6,36	$ \begin{array}{ccccccccccccccccccccccccccccccccc$	4—3
4994 ,1323	8	0,91	3,39		4—3
4988,963	6	4,16	6,64	$y \ ^5D^{\circ} - h \ ^5D$ $z \ ^7F^{\circ} - e \ ^7D$ $z \ ^3D^{\circ} - e \ ^3D$ $y \ ^5D^{\circ} - h \ ^5D$ $y \ ^5D^{\circ} - f \ ^5P$	3—3
4985,5539	7	2,86	5,35		3—4
4985,260	7	3,92	6,41		2—2
4983,855	6	4,16	6,59		4—4
4983,258	5	4,15	6,64		3—2
4982,507	8	4,10	6,59	$y \ ^{5}D^{\circ} - f \ ^{5}P$ $z \ ^{3}D^{\circ} - e \ ^{3}D$ $z \ ^{5}F^{\circ} - e \ ^{5}F$ $z \ ^{7}F^{\circ} - e \ ^{7}D$ $z \ ^{7}F^{\circ} - e \ ^{7}D$	4—3
4973,108	3	3,95	6,44		1—1
4966,0968	8	3,33	5,82		5—5
4957,6059	60	2,83	5,31		6—5
4957,3054	20	2,85	5,35		4—4
4939,6896	4	0,86	3,36	$a {}^{5}F - z {}^{5}F^{\circ}$ $z {}^{7}F^{\circ} - e {}^{7}D$ $a {}^{3}P - y {}^{3}D^{\circ}$ $z {}^{7}F^{\circ} - e {}^{7}D$ $z {}^{7}F^{\circ} - e {}^{7}D$	5—4
4938,8206	10	2,87	5,38		2—3
4924,7753	3	2,28	4,79		2—2
4920,5096	60	2,83	5,35		5—4
4919,0003	30	2,86	5,38		3—3
4910,025	2	3,39	5,92	$z {}^{5}F^{\circ} - e {}^{5}F$ $z {}^{7}F^{\circ} - e {}^{7}D$	3-3
4903,3169	12	2,88	5,41		1-2
4891,4989	50	2,84	5,37		4-3
4890,7616	25	2,87	5,41		2-2
4878,2182	12	2,87	5,42		0-1
4872 ,1444	20	2,88	5,42	$z^{7}F^{\circ}-e^{7}D$	1-1
4871 ,3244	25	2,86	5,41	$z^{7}F^{\circ}-e^{7}D$	3-2
4859 ,7480	15	2,87	5,42	$z^{7}F^{\circ}-e^{7}D$	2-1
4791 ,248	5	3,27	5,86	$a^{3}D-w^{3}D^{\circ}$	1-1
4789 ,6537	7	3,54	6,13	$a^{1}D-z^{1}D^{\circ}$	2-2
4786,8106	5	3,01	5,60	$c\ ^{3}P-x\ ^{3}D^{\circ} \ z\ ^{5}D^{\circ}-e\ ^{5}F \ z\ ^{5}D^{\circ}-e\ ^{5}F \ b\ ^{3}G-y\ ^{3}G^{\circ} \ z\ ^{5}P^{\circ}-f\ ^{5}D$	2-3
4736,7807	12	3,21	5,82		4-5
4707,2807	8	3,24	5,87		3-4
4691,4144	6	3,00	5,63		4-4
4678,852	7	3,60	6,24		3-4
4668 ,1422	6	3,26	5,92	$z ^5D^{\circ}-e ^5F$ $z ^5P^{\circ}-e ^7P$ $b ^3G-y ^3G^{\circ}$ $z ^5D^{\circ}-e ^5F$ $z ^5D^{\circ}-e ^5F$	2-3
4667 ,459	6	3,60	6,25		3-4
4647 ,4370	6	2,95	5,61		5-5
4637 ,518	3	3,28	5,95		1-2
4625 ,0527	3	3,24	5,92		3-3
4619,298	3	3,60	6,28	$z {}^{5}P^{\circ} - f {}^{5}D$	3-2
4611,289	5	3,65	6,33	$z {}^{5}P^{\circ} - e {}^{5}S$	2-2
4602,9446	9	1,48	4,18	$a {}^{3}F - y {}^{5}F^{\circ}$	4-5
4592,6547	5	1,56	4,26	$a {}^{3}F - y {}^{5}F^{\circ}$	3-3
4547,8505	4	3,54	6,26	$a {}^{1}D - z {}^{1}F^{\circ}$	2-3
4531 ,152	8	1,48	4,22	$a \ ^{3}F - y \ ^{5}F^{\circ}$ $a \ ^{5}P - x \ ^{5}D^{\circ}$ $z \ ^{5}P^{\circ} - e \ ^{5}S$ $a \ ^{5}P - x \ ^{5}D^{\circ}$ $a \ ^{5}D - z \ ^{7}F^{\circ}$	4-4
4528 ,6175	18	2,18	4,91		3-4
4525 ,146	5	3,60	6,34		3-2
4494 ,5669	12	2,20	4,95		2-3
4489 ,7416	3	0,12	2,89		0-1
4484,225 4482,2563 4482,1720 4476,0206 4469,380	4 6 4 10 5	3,60 2,23 0,11 2,84 3,65	6,36 4,99 2,87 5,61 6,43	$z {}^{5}P^{\circ} - g {}^{5}D$ $a {}^{5}P - x {}^{5}D^{\circ}$ $a {}^{5}D - z {}^{7}F^{\circ}$ $b {}^{3}P - x {}^{3}D^{\circ}$ $z {}^{5}P^{\circ} - e {}^{5}P$	$ \begin{array}{r} 3-4 \\ 1-2 \\ 1-2 \\ 1-2 \\ 2-3 \end{array} $
4466,5542	12	2,83	5,60	$\begin{array}{c} b \ ^{3}P - x \ ^{3}D^{\circ} \\ a \ ^{5}D - z \ ^{7}F^{\circ} \\ a \ ^{5}P - x \ ^{5}D^{\circ} \\ b \ ^{3}P - x \ ^{3}D^{\circ} \\ a \ ^{5}P - x \ ^{5}D^{\circ} \end{array}$	2-3
4461,6544	8	0,09	2,86		2-3
4459,1213	10	2,18	4,95		3-3
4454,3835	5	2,83	5,61		2-2
4447,7212	9	2,23	5,01		1-1
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
4443 ,1963 4442 ,3428 4433 ,221 4430 ,6175 4427 ,3118	7 12 3 6 10	2 ,86 2 ,20 3 ,65 2 ,23 0 ,05	5,64 4,99 6,44 5,02 2,85	$b \ ^{3}P - x \ ^{3}D^{\circ}$ $a \ ^{5}P - x \ ^{5}D^{\circ}$ $z \ ^{5}P^{\circ} - e \ ^{5}P$ $a \ ^{5}P - x \ ^{5}D^{\circ}$ $a \ ^{5}P - x \ ^{5}D^{\circ}$ $a \ ^{5}D - z \ ^{7}F^{\circ}$	0-1 2-2 2-1 1-0 3-4
4422,5703 4415,1250 4408,4176 4407,7130 4404,7525	6 20 6 5 30	2,84 1,61 2,20 2,18 1,56	5,64 4,42 5,01 4,99 4,37	$b\ ^{3}P{-}x\ ^{3}D^{\circ} \ a\ ^{3}F{-}z\ ^{5}G^{\circ} \ a\ ^{5}P{-}x\ ^{5}D^{\circ} \ a\ ^{5}P{-}x\ ^{5}D^{\circ} \ a\ ^{3}F{-}z\ ^{5}G^{\circ}$	1—1 2—3 2—1 3—2 3—4
4390,9542 4388,411 4387,8959 4383,5473 4375,9318	4 4 4 45 9	3,01 3,60 3,07 1,48 0,00	5,84 6,43 5,89 4,31 2,83	$\begin{array}{c} b \ ^{3}G - z \ ^{3}H^{\circ} \\ z \ ^{5}P^{\circ} - e \ ^{5}P \\ c \ ^{3}P - y \ ^{3}S^{\circ} \\ a \ ^{3}F - z \ ^{5}G^{\circ} \\ a \ ^{5}D - z \ ^{7}F^{\circ} \end{array}$	3-4 3-3 1-1 4-5 4-5
4369 ,7745 4367 ,5814 4352 ,7371 4337 ,0484 4327 ,098	7 5 9 10 3	3,05 2,99 2,22 1,56 3,54	5,88 5,82 5,07 4,42 6,41	$a {}^{1}G - z {}^{1}G^{\circ}$ $b {}^{3}G - z {}^{3}H^{\circ}$ $a {}^{5}P - z {}^{5}S^{\circ}$ $a {}^{3}F - z {}^{5}G^{\circ}$ $a {}^{1}D - y {}^{1}D^{\circ}$	4-4 $ 4-5 $ $ 1-2 $ $ 3-3 $ $ 2-2$
4325,7647 4315,0872 4309,3771 4307,9048 4299,2409		1,61 2,20 2,95 1,56 2,42	4,47 5,07 5,82 4,44 5,31	$a\ ^{3}F-z\ ^{3}G^{\circ}\ a\ ^{5}P-z\ ^{5}S^{\circ}\ b\ ^{3}G-z\ ^{3}H^{\circ}\ a\ ^{3}F-z\ ^{3}G^{\circ}\ z\ ^{7}D^{\circ}-e\ ^{7}D$	2—3 2—2 5—6 3—4 4—5
4298,040 4294,1271 4285,4453 4282,4057 4271,7634	12	3,05 1,48 3,23 2,18 1,48	5,93 4,37 6,12 5,07 4,39	$a\ {}^{1}G-x\ {}^{3}G^{\circ}\ a\ {}^{3}F-z\ {}^{5}G^{\circ}\ b\ {}^{3}H-y\ {}^{3}H^{\circ}\ a\ {}^{5}P-z\ {}^{5}S^{\circ}\ a\ {}^{3}F-z\ {}^{3}G^{\circ}$	4-5 $ 4-4 $ $ 6-6 $ $ 3-2 $ $ 4-5$
4271, 1589 4267, 83 4260, 4794 4250, 7896 4250, 1248	5 35 25	2,45 3,11 2,40 1,56 2,47	5,35 6,01 5,31 4,47 5,38	$z {}^{7}D^{\circ} - e {}^{7}D$ $c {}^{3}P - x {}^{3}P^{\circ}$ $z {}^{7}D^{\circ} - e {}^{7}D$ $a {}^{3}F - z {}^{3}G^{\circ}$ $z {}^{7}D^{\circ} - e {}^{7}D$	3-4 0-1 5-5 3-3 2-3
4248 ,2275 4247 ,433 4245 ,2594 4238 ,821 4235 ,9433	12 6 10	3,07 3,37 2,85 3,40 2,42	5,98 6,29 5,77 6,31 5,35	$c\ ^{3}P-x\ ^{3}P^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}G\ b\ ^{3}P-z\ ^{3}S^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}G\ z\ ^{7}D^{\circ}-e\ ^{7}D$	1-2 4-5 0-1 3-4 4-4
4233,6089 4227,432 4225,465 4224,176 4222,2181	$ \begin{array}{c} 30 \\ 6 \\ 6 \end{array} $	2,48 3,33 3,42 3,37 2,45	5,41 6,26 6,35 6,31 5,38	$z {}^{7}D^{\circ}-e {}^{7}D$ $z {}^{5}F^{\circ}-e {}^{5}G$ $z {}^{5}F^{\circ}-e {}^{5}G$ $z {}^{5}F^{\circ}-e {}^{7}F$ $z {}^{7}D^{\circ}-e {}^{7}D$	1-2 5-6 2-3 4-5 3-3
4219,3641 4217,555 4216,1854 4213,650 4210,3491	7 4 8 5	3,57 3,43 0,00 2,84 2,48	6,51 6,37 2,94 5,78 5,42	$a\ ^{1}H-y\ ^{3}I^{\circ}\ z\ ^{5}F^{\circ}-e\ ^{5}G\ a\ ^{5}D-z\ ^{7}P^{\circ}\ b\ ^{3}P-y\ ^{3}P^{\circ}\ z\ ^{7}D^{\circ}-e\ ^{7}D$	5—6 1—2 4—4 1—0 1—1
4208,615 4206,698 4203,986 4202,032 4199,098	7 10 30 30	3,39 0,05 2,84 1,48 3,04	6,34 3,00 5,79 4,44 5,99	$z {}^{5}F^{\circ} - e^{ 7}F$ $a {}^{5}D - z {}^{7}P^{\circ}$ $b {}^{3}P - y {}^{3}P^{\circ}$ $a {}^{3}F - z {}^{3}G^{\circ}$ $a {}^{1}G - z {}^{1}H^{\circ}$	3-3 3-3 1-2 4-4 4-5
4198,3098 4196,214 4195,337	8 20 4 5	2,40 3,39 3,33	5,35 6,35 6,29	$z {}^{7}D^{\circ}-e {}^{7}D$ $z {}^{5}F^{\circ}-e {}^{5}G$ $z {}^{5}F^{\circ}-e {}^{5}G$	5-4 3-3 5-5

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4191 ,4358	15	$\substack{2,47\\2,42}$	5,42	z ¬D°—e¬D	2—1
4187 ,8015	20		5,38	z ¬D°—e¬D	4—3
4187,0436	20	2,45	5,41	$z^{7}D^{\circ}-e^{7}D$	3-2
4184,8941	10	2,83	5,79	$b^{3}P-y^{3}P^{\circ}$	2-2
4181,7571	15	2,83	5,79	$b^{3}P-u^{5}D^{\circ}$	2-3
4177,595	4	0,92	3,87	$a^{5}F-z^{3}F^{\circ}$	4-4
4176,572	7	3,37	6,34	$z^{5}F^{\circ}-f^{5}F$	4-5
4175,6386 4174,9137 4158,798 4157,791 4156,8021	10 5 5 8 12	2,84 0,92 3,43 3,42 2,83	5,81 3,88 6,40 6,41 5,81	$b\ ^{3}P-u\ ^{5}D^{\circ}\ a\ ^{5}F-z\ ^{3}D^{\circ}\ z\ ^{5}F^{\circ}-f\ ^{5}F\ z\ ^{5}F^{\circ}-f\ ^{5}F\ b\ ^{3}P-u\ ^{5}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 4-3 \\ 1-2 \\ 2-3 \\ 2-2 \end{array} $
4154,812	9	3,37	6,34	$z {}^{5}F^{\circ} - e {}^{7}G$ $b {}^{3}P - y {}^{3}P^{\circ}$ $z {}^{5}F^{\circ} - f {}^{5}F$ $z {}^{5}F^{\circ} - e {}^{7}G$ $a {}^{3}F - z {}^{3}G^{\circ}$	4-5
4154,5021	12	2,83	5,81		2-1
4153,910	10	3,39	6,38		3-4
4149,370	5	3,33	6,31		5-6
4147,6719	10	1,48	4,47		4-3
4143,8703 4143,4174 4137,004 4134,6798 4132,903	30 15 7 12 8	1,56 3,05 3,41 2,83 2,84	4,55 6,03 6,40 5,82 5,84	$a\ ^{3}F-y\ ^{3}F^{\circ}\ a\ ^{1}G-y\ ^{1}G^{\circ}\ a\ ^{1}P-y\ ^{1}D^{\circ}\ b\ ^{3}P-w\ ^{3}D^{\circ}\ b\ ^{3}P-w\ ^{3}D^{\circ}$	$ \begin{array}{r} 3-4 \\ 4-4 \\ 1-2 \\ 2-3 \\ 1-2 \end{array} $
4132,0603	25	1,61	4,61	$a\ ^{3}F-y\ ^{3}F^{\circ}\ b\ ^{3}P-w\ ^{3}D^{\circ}\ b\ ^{3}P-x\ ^{3}F^{\circ}\ a\ ^{1}H-z\ ^{1}I^{\circ}\ b\ ^{3}P-w\ ^{3}D^{\circ}$	2-3
4127,6113	7	2,86	5,86		0-1
4121,8050	5	2,83	5,82		2-3
4118,5484	15	3,57	6,58		5-6
4109,8053	9	2,84	5,86		1-1
4107,4917	12	2,83	5,84	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1
4098,187	4	3,24	6,26		3-3
4085,324	4	3,24	6,27		3-3
4084,499	6	3,33	6,36		5-4
4076,637	8	3,21	6,24		4-4
4071,7399	40	1,61	4,65	$a\ ^{3}F-y\ ^{3}F^{\circ}\ z\ ^{5}D^{\circ}-e\ ^{7}P\ b\ ^{3}P-1^{\circ}\ a\ ^{3}F-y\ ^{3}F^{\circ}\ b\ ^{3}P-y\ ^{3}S^{\circ}$	2-2
4067,982	8	3,21	6,25		4-4
4066,979	6	2,83	5,87		2-2
4063,5963	45	1,56	4,61		3-3
4062,4440	10	2,84	5,89		1-1
4045,8147	60	1,48	4,55	$a\ ^{3}F-y\ ^{3}F^{\circ}\ b\ ^{3}P-y\ ^{3}S^{\circ}\ z\ ^{5}D^{\circ}-e\ ^{5}G\ z\ ^{5}D^{\circ}-e\ ^{5}G\ a\ ^{3}G-z\ ^{3}H^{\circ}$	4-4
4044,6125	6	2,83	5,89		2-1
4030,492	6	3,21	6,29		4-5
4024,739	6	3,24	6,31		3-4
4021,8696	12	2,76	5,84		3-4
4017,152	6	3,05	6,13	$a {}^{1}G - v {}^{3}G^{\circ}$ $a {}^{1}H - y {}^{1}H^{\circ}$ $a {}^{5}P - x {}^{5}P^{\circ}$ $a {}^{3}G - x {}^{3}F^{\circ}$ $a {}^{3}F - y {}^{3}F^{\circ}$	4-5
4014,534	10	3,57	6,66		5-5
4009,7154	10	2,22	5,31		1-2
4007,2735	6	2,76	5,84		3-2
4005,2440	25	1,56	4,65		3-2
3998,0554	10	2,69	5,79	$a\ {}^{3}G-u\ {}^{5}D^{\circ}$ $a\ {}^{3}G-z\ {}^{3}H^{\circ}$ $a\ {}^{3}D-v\ {}^{3}F^{\circ}$ $a\ {}^{3}D-y\ {}^{1}D^{\circ}$ $a\ {}^{3}G-x\ {}^{3}F^{\circ}$	5-4
3997,3952	15	2,73	5,82		4-5
3986,472	5	3,25	6,36		3-4
3985,388	3	3,30	6,41		2-2
3983,9593	10	2,73	5,83		4-3
3981,7743	7	2,73	5,84	a ³ G-z ³ H°	4—4
3977,7437	12	2,20	5,31	a ⁵ P-x ⁵ P°	2—2
3971,3250	9	2,69	5,81	a ³ G-x ³ F°	5—4
3969,2595	30	1,48	4,61	a ³ F-y ³ F°	4—3
3967,4234	8	3,29	6,43	b ³ H-u ³ G°	4—3

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λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
3966,6304	10	2,73	5,87	$a^{3}G-z^{1}G^{\circ}$	3—4
3966,0645	10	1,61	4,73	$a^{3}F-y^{3}D^{\circ}$	2—3
3963,109	$\frac{6}{12}$	$^{3,28}_{2,68}$	$\frac{6,41}{5,21}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1-2 \\ 5-6 \end{array}$
3956,681 3956,4574	9	$\frac{2,00}{3,23}$	$5,81 \\ 6,37$	$b^{3}H-u^{3}G^{\circ}$	6-5
3952,606	8	2,68	5,82	$a~^3G$ — $z~^3H^\circ$	5—5
3951,168	$\tilde{9}$	3,27	6,41	$a^{3}D-y^{1}D^{\circ}$	1-2
3949,9558	10	2,18	5,31	$a {}^5P$ — $x {}^5P^{\circ}$	3-2
3948 ,7778 3948 ,107	$\begin{array}{c} 10 \\ 6 \end{array}$	$\substack{3,26\\3,25}$	$\frac{6,41}{6,29}$	b ³ H—u ³ G° z ⁵ D°—f ⁵ F	5— 4 3 — 4
			6,38	$b^{3}P-x^{3}P^{\circ}$	1—2
3942,4418 $3940,8797$	$\frac{6}{5}$	$2,84 \ 0,96$	5,98 4,11	$a {}^{5}F - x {}^{5}D^{\circ}$	3—4
3935,8143	8	2,83	$\frac{1}{5}, \frac{1}{98}$	$b^{3}P - v^{5}F^{\circ}$	2-2
3933,605	10	0 0 =	6,22	$c {}^{3}P - w {}^{3}P {}^{\circ}$	1-2
3930,2981	25	$\left\{ egin{array}{c} 3,07 \\ 3,26 \\ 0,09 \end{array} \right.$	$6,41 \ 3,24$	z ⁵ D°—f ⁵ F a ⁵ D—z ⁵ D°	$\begin{array}{c} 2-1 \\ 2-3 \end{array}$
				$a \ ^5D - z \ ^5D^{\circ}$	1-2
$3927,9216 \ 3925,947$	$\frac{30}{6}$	$\substack{0,11\\2,86}$	$^{3,26}_{6,01}$	$b {}^{3}P - x {}^{3}P \circ$	0-1
3922,9134	$2\overline{5}$	0,05	3,21	$a~^5D-z~^5D^\circ$	3—4
3920,2601	20	0, 12	$^{3,28}_{c,17}$	$a {}^{5}D - z {}^{5}D^{\circ}$	0—1 3—3
3918,646	6	3,01	6,17	b 3G—v 3G°	
3917,1834	8	0,99	4,16	$a {}^{5}F - y {}^{5}D^{\circ} \\ b {}^{3}H - 6^{\circ}$	2—3 6—5
3916,733 3913,6339	$\frac{6}{4}$	$^{3,23}_{2,28}$	6,40 5,44	$a {}^{3}P - w {}^{5}D^{\circ}$	2-3
3907,9371	4	$\frac{2}{2}, \frac{76}{76}$	5,92	$a~^3G-w~^5G^{\circ}$	3—2
3906,4814	8	0,11	3,28	$a ^5D - z ^5D^{\circ}$	1—1
3903,9011	5	2,99	6,16	$b {}^{3}G - y {}^{3}H^{\circ}$	4-4
3902,9484	$\frac{20}{30}$	$^{1,56}_{0,00}$	$\substack{4,73\\3,26}$	$a \ {}^{3}F - y \ {}^{3}D^{\circ}$ $a \ {}^{5}D - z \ {}^{5}D^{\circ}$	$\begin{array}{c} 3-3 \\ 2-2 \end{array}$
3899,7086 3898,012	30 10	0,09 1,01	4,19	$a \stackrel{D-2}{=} \stackrel{D}{=} \stackrel{D}{=} 0$	$\frac{1}{1} - \frac{2}{1}$
3897,895	8	$^{2},\!69$	5,87	a 3G — w 5G ${}^\circ$	5—6
3895,6579	25	0,11	3,29	$a ^5D - z ^5D^{\circ}$	1-0
3893,3935	7 5	$^{2},95$	$\frac{6,13}{6,60}$	$b {}^{3}G - v {}^{3}G^{\circ}$ $a {}^{1}P - z {}^{1}P^{\circ}$	5—5 1—1
$3891,929 \\ 3888,517$	$\frac{3}{20}$	3,41 1,60	$^{6,60}_{4,79}$	$a {}^{3}F - z {}^{3}D^{\circ}$ $a {}^{3}F - y {}^{3}D^{\circ}$	$\begin{array}{c} 1 - 1 \\ 2 - 2 \end{array}$
3886,2839	40	0.05	$^{1,10}_{3,24}$	$a \stackrel{\circ}{}^{5}D - z \stackrel{\circ}{}^{5}D \stackrel{\circ}{}^{\circ}$	$\bar{3}$ — $\bar{3}$
3885,5165	5	2,42	5,61	a 3P — x 3D c	1—2
3878,663	8	2,44	5,63	a ³H−y ³G°	4-3
3878, 5745	100	0.09	3,28 4,46	$a \ ^5D - z \ ^5D^{\circ}$ $a \ ^5F - y \ ^5D^{\circ}$	2—1 3—3
$3878,0206 \\ 3873,7624$	60 8	$^{0,96}_{2,43}$	4,16 $5,63$	$a {}^{3}H - y {}^{3}G^{\circ}$	5—3 5—4
3872,5032	60	0,99	4,19	a 5F $-y$ 5D \circ	2—2
3871,7513	4	$^{0,95}_{2,95}$	6,14	b 3G—y 3H°	5— 5
3869,5615	4	2,73	5,93	$a~^3G$ — $x~^3G^\circ$	4-5
3867,2184	$\begin{array}{c} 7 \\ 30 \end{array}$	$^{3,02}_{4,04}$	$^{6,22}_{4,22}$	$c {}^{3}P - w {}^{3}P^{\circ} \\ a {}^{5}F - y {}^{5}D^{\circ}$	$\begin{array}{c} 2-2 \\ 1-1 \end{array}$
3865,5256		1,01	3,21	$a \stackrel{T}{=} g \stackrel{D}{=} D$ $a \stackrel{5}{=} D \stackrel{\circ}{=} z \stackrel{5}{=} D \stackrel{\circ}{=}$	4—4
3859 ,9132 3859 ,2143	$\frac{300}{40}$	$^{0,00}_{2,40}$	$\frac{3,21}{5,61}$	$a ^{3}H-y ^{3}G^{\circ}$	6-5
3856,373	50	0,05	3,26	$a~^5D$ — $z~^5D^\circ$	3-2
3852,5752	6	$\frac{2,18}{0.00}$	5,39	$a {}^{5}P - w {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{3}P^{\circ}$	$ \begin{array}{r} 3-4 \\ 2-2 \end{array} $
3850,8193	12	0,99	4,21		1— 0
3849,9694	40 8	$^{1,01}_{3,25}$	$\overset{4}{6},\overset{23}{,48}$	a ⁵ F−y ⁵ D° a ³ D−t ³ D°	1—0 3—3
3846 ,8023 3845 ,1706	8 5	$\overset{3,23}{2,42}$	$\frac{0,46}{5,64}$	$a {}^{3}P$ — $x {}^{3}D$ $^{\circ}$	1-1
3843,2596	8	3,05	6,27	a ${}^{1}G$ — z ${}^{1}F$ ${}^{\circ}$	4-3
3841 ,0499	80	1,61	4,83	$a {}^{3}F - y {}^{3}D^{\circ}$	2—1 2—1
3840,4397	80	0,99	4,22 6.27	$a {}^{5}F - y {}^{5}D^{\circ} \\ a {}^{1}G - x {}^{1}G^{\circ}$	2—1 4—4
$3839,2584 \\ 3836,333$	7 4	$^{3,05}_{3,30}$	$^{6,27}_{6,53}$	$a \stackrel{\circ}{}_{3}D = t \stackrel{\circ}{}_{3}D^{\circ}$	2-2
0000 1000	•	J,00	,		453

λ, Å	I	F &V	F eV	Transition	
	1	E _H , eV	E _B , eV	Transition	,
3834,2244 3833,3103	100 5	$0,96 \\ 2,56$	4,19 5,79	$a \ ^5F-y \ ^5D^{\circ} \ b \ ^3F-u \ ^5D^{\circ}$	3—2 4—4
3827 ,8256 3825 ,8834	$\begin{array}{c} \textbf{75} \\ 200 \end{array}$	1,56 0,91	4,79 4,16	$a\ {}^{3}F-y\ {}^{3}D^{\circ}\ a\ {}^{5}F-y\ {}^{5}D^{\circ}$	3—2 4—3
3824,4455 3821,1807	50 10	$0,00 \\ 3,27$	$\substack{3,24\\6,51}$	$a \ ^5D - z \ ^5D^{\circ}$ $b \ ^3H - y \ ^3I^{\circ}$	4—3 5—6
3820,4274 3815,8430	250 100	0,86 1,48	4,11 4,73	$a \ ^5F - y \ ^5D^{\circ}$ $a \ ^3F - y \ ^3D^{\circ}$	5—4 4—3
3812,9658 3808,7306	40 4	$\substack{0,96\\2,56}$	4,21 5,81	$a \ {}^{5}F - z \ {}^{3}P^{\circ}$ $b \ {}^{3}F - x \ {}^{3}F^{\circ}$	3-2 4-4
3807,5392 3806,6992	$\frac{7}{10}$	2,22 3,25	5,47 $6,53$	$a \ ^5P - w \ ^5D^{\circ}$ $b \ ^3H - w \ ^3H^{\circ}$	$ \begin{array}{r} 1-2 \\ 5-5 \end{array} $
3805,3450 3799,5498	12 50	3,30 0,96	6,56 $4,22$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4—5 3—4
3798,5134 3797,517 3795,0045	40 12 60	$^{0,91}_{3,22}_{0,99}$	4,18 6,50 4,26	$a\ ^{5}F-y\ ^{5}F^{\circ}\ b\ ^{3}H-w\ ^{3}H^{\circ}\ a\ ^{5}F-y\ ^{5}F^{\circ}$	$ \begin{array}{c} 4-5 \\ 6-6 \\ 2-3 \end{array} $
3794,340 3790,0943	8 12	$2,45 \\ 0,99$	5,72 4,26	$a {}^{3}H - z {}^{3}I^{\circ}$ $a {}^{5}F - z {}^{3}P^{\circ}$	4—5 2—1
3787 ,8825 3786 ,6781	50 8	1,01 1,01	4,28 4,29	$a \ ^{5}F - y \ ^{5}F^{\circ}$ $a \ ^{5}F - z \ ^{3}P^{\circ}$	$\begin{array}{c} 2 - 1 \\ 1 - 2 \\ 1 - 0 \end{array}$
3786,176	4 6	2,83	6,10	$b {}^{3}P - v {}^{3}D^{\circ}$ $a {}^{3}H - z {}^{3}I^{\circ}$	2—2 5—6
3785,951 3779,446 3776,4553	6 6	$2,43 \\ 2,56 \\ 2,18$	5,70 5,84 5,46	$a {}^{5}F - z {}^{5}F$ $a {}^{5}P - w {}^{5}F$	3—6 4—3 3—4
3774,8266 3767,1939	5 80	2,22 1,01	5,50 4,30	$a \ ^5P - w \ ^5D^{\circ}$ $a \ ^5F - y \ ^5F^{\circ}$	1 - 1 $1 - 1$
3765,5414 3763,7910	20 100	$^{3,23}_{0,99}$	$^{6,52}_{4,28}$	b ³ H—y ³ I° a ⁵ F—y ⁵ F°	6 7 22
$3760,5335 \\ 3760,052$	6 8	$\begin{array}{c} 2,22 \\ 2,40 \end{array}$	$5,51 \\ 5,70$	$a {}^{5}P - y {}^{5}S^{\circ}$ $a {}^{3}II - z {}^{3}I^{\circ}$	$\begin{array}{c} 1-2 \\ 6-7 \end{array}$
3758,2350 3753,6134	150 8	0,96 $2,18$	4,26 $5,47$	$a \ ^5F-y \ ^5F^\circ \ a \ ^5P-w \ ^5D^\circ \ $	3—3 3—2
3749,4875 3748,492	200 7	0,91 3,57	$\overset{4}{6}$,22 $\overset{6}{6}$,87	$a {}^{5}F - y {}^{5}F^{\circ}$ $a {}^{1}H - v {}^{3}H^{\circ}$	4-4 5-6
3748 ,2639 3746 ,929	60 6	$0,11 \\ 3,01$	3,41 6,31	a ⁵ D-z ⁵ F° z ⁷ P°-f ⁷ D	$\begin{array}{c} 1-2 \\ 3-3 \end{array}$
3745,9013 3745,5623	40 100	$0,12 \\ 0,09 \\ 2,57$	3,43 3,39	$ \begin{array}{c} a \ ^5D - z \ ^5F^{\circ} \\ a \ ^5D - z \ ^5F^{\circ} \end{array} $	$\begin{array}{c} 0 - 1 \\ 2 - 3 \end{array}$
3743,468 3743,3640 3738,3078	$egin{array}{c} 6 \ 20 \ 10 \end{array}$	$\begin{array}{c} 3,57 \\ 0,99 \\ 3,27 \end{array}$	6,88 4,30 6,58	$a {}^{1}H - x {}^{1}H^{\circ}$ $a {}^{5}F - y {}^{5}F^{\circ}$ $b {}^{3}H - z {}^{1}I^{\circ}$	5—5 2—1 5—6
3737,1333	150	0,05	3,36	a 5D-z 5F°	3-4
3735,330 3734,8659 3733,3191	$\begin{array}{c} 6\\300\\40 \end{array}$	$\begin{array}{c} 2,94 \\ 0,86 \\ 0,11 \end{array}$	6,25 4,18 3,43	$z^{7}P^{\circ}-e^{7}P$ $a^{5}F-y^{5}F^{\circ}$ $a^{5}D-z^{5}F^{\circ}$	4—4 5—5 1—1
3732,399	10	2,20	5,51	$a \ ^5P-y \ ^5S^{\circ}$	2—2
3727 ,6211 3726 ,925 3724 ,3796	50 6 8	$0,96 \\ 3,04 \\ 2,28$	$^{4,28}_{6,37}$ 5,60	$a \ ^{5}F - y \ ^{5}F^{\circ} \ z \ ^{7}P^{\circ} - e \ ^{7}F \ a \ ^{3}P - x \ ^{3}D^{\circ}$	$ \begin{array}{r} 3-2 \\ 2-2 \\ 2-3 \end{array} $
3722,5642 3719,9367	50 2 50	$0,09 \\ 0,00$	3,41 3,33	$ \begin{array}{c} a \ ^{5}D - z \ ^{5}F^{\circ} \\ a \ ^{5}D - z \ ^{5}F^{\circ} \end{array} $	2-3 2-2 4-5
3716,448 3709,2484	12 75	2,94 0,91	6,27 4,26	z ⁷ P°—e ⁷ P a ⁵ F—y ⁵ F°	4-3 4-3
3707,9216 3707,823	$\frac{8}{20}$	$\substack{2,17\\0,09}$	5,51 3,43	$a {}^{5}P - y {}^{5}S^{\circ}$ $a {}^{5}D - z {}^{5}F^{\circ}$	3—2 2—1
3707,049	8	3,00	6,34	z ⁷ P°—e ⁷ F	33

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
3705,5674 3704,4635 3701,090 3695,054 3694,010	100 10 20 8 20	0,05 2,69 3,00 2,59 3,04	3,39 6,03 6,35 5,94 6,40	$a\ ^5D-z\ ^5F^{\circ}\ a\ ^3G-y\ ^1G^{\circ}\ z\ ^7P^{\circ}-e\ ^7F\ b\ ^3F-v\ ^5F^{\circ}\ z\ ^7P^{\circ}-e\ ^7S$	3—3 5—4 3—4 3—4 2—3
3689,463 3687,4589 3686,003 3684,1102 3683,0562	12 40 15 15 10	2,94 0,86 2,94 2,73 0,05	6,30 4,22 6,31 6,09 3,41	$z^{7}P^{\circ}-f^{7}D$ $a^{5}F-y^{5}F^{\circ}$ $z^{7}P^{\circ}-e^{7}F$ $a^{3}G-v^{3}D^{\circ}$ $a^{5}D-z^{5}F^{\circ}$	4-4 5-4 4-5 4-3 3-2
3682,209 3679,9152 3678,8620 3677,6309 3676,3135	20 40 3 12 6	3,54 0,00 2,43 2,75 2,56	6,91 3,36 5,79 6,11 5,93	$a\ ^{1}D-w\ ^{1}D^{\circ}\ a\ ^{5}D-z\ ^{5}F^{\circ}\ a\ ^{3}P-y\ ^{3}P^{\circ}\ a\ ^{3}G-w\ ^{3}F^{\circ}\ b\ ^{3}F-x\ ^{3}G^{\circ}$	2-2 4-4 1-0 3-2 4-5
3670,071 3670,028 3669,5229 3659,521 3651,4699	3 3 10 8 20	2,95 2,84 2,73 2,45 2,76	6,33 6,22 6,10 5,84 6,15	$b\ ^{3}G-x\ ^{3}H^{\circ}\ b\ ^{3}P-w\ ^{3}P^{\circ}\ a\ ^{3}G-w\ ^{3}F^{\circ}\ a\ ^{3}H-z\ ^{3}H^{\circ}\ a\ ^{3}G-v\ ^{3}G^{\circ}$	5—6 1—2 4—3 4—4 3—4
3649,5090 3647,8439 3645,825 3640,3918 3638,2998	$12 \\ 100 \\ 6 \\ 15 \\ 12$	2,69 0,91 3,11 2,73 2,76	6,08 4,31 6,51 6,13 6,16	$a\ {}^{3}G - w\ {}^{3}F^{\circ}$ $a\ {}^{5}F - z\ {}^{5}G^{\circ}$ $c\ {}^{3}P - u\ {}^{3}D^{\circ}$ $a\ {}^{3}G - v\ {}^{3}G^{\circ}$ $a\ {}^{3}G - y\ {}^{3}H^{\circ}$	5-4 4-5 0-1 4-5 3-4
3634,334 3631,4646 3631,096 3625,148 3623,1878	$6 \\ 125 \\ 7 \\ 6 \\ 8$	2,95 0,96 2,83 2,83 2,40	6,35 4,37 6,24 6,25 5,82	$z^{7}P^{\circ}-e^{5}G$ $a^{5}F-z^{5}G^{\circ}$ $z^{5}F^{\circ}-f^{7}D$ $z^{7}F^{\circ}-f^{5}D$ $u^{3}H-z^{3}H^{\circ}$	4-3 3-4 5-5 5-4 6-6
3622,005 3621,4640 3618,7694 3617,788 3612,074	12 15 125 12 8	2,76 2,73 0,99 3,02 2,83	$egin{array}{c} 6,\!17 \\ 6,\!14 \\ 4,\!42 \\ 6,\!45 \\ 6,\!26 \end{array}$	$a\ {}^{3}G - v\ {}^{3}G^{\circ}$ $a\ {}^{3}G - y\ {}^{3}H^{\circ}$ $a\ {}^{5}F - z\ {}^{5}G^{\circ}$ $c\ {}^{3}P - u\ {}^{3}D^{\circ}$ $z\ {}^{7}F^{\circ} - e\ {}^{5}G$	$ \begin{array}{r} 3-3 \\ 4-5 \\ 2-3 \\ 2-3 \\ 5-6 \end{array} $
3610,162 3608,8609 3606,6821 3605,458 3603,2068	20 100 20 15 10	2,81 1,01 2,69 2,73 2,69	6,24 $4,45$ $6,12$ $6,16$ $6,13$	z ⁷ F°—e ⁷ F a ⁵ F—z ⁵ G° a ³ G—y ³ H° a ³ G—y ³ G°	6-6 $1-2$ $5-6$ $4-4$ $5-5$
3594,636 3589,1063 3586,9861 3586,114 3585,7068	3 8 30 10 20	2,85 0,86 0,99 3,23 0,91	6,30 4,31 4,45 6,69 4,37	$z^{7}F^{\circ}-f^{7}D$ $a^{5}F-z^{5}G^{\circ}$ $a^{5}F-z^{5}G^{\circ}$ $b^{3}H-t^{3}G^{\circ}$ $a^{5}F-z^{5}G^{\circ}$	4-4 $ 5-5 $ $ 2-2 $ $ 6-5 $ $ 4-4$
3585,3206 3584,6627 3581,195 3571,996 3570,258	$ \begin{array}{r} 30 \\ 8 \\ 250 \\ 6 \\ 20 \end{array} $	0,96 2,69 0,86 2,83 2,80	4,42 6,14 4,32 6,31 6,27	$a \ ^{5}F - z \ ^{5}G^{\circ}$ $a \ ^{3}G - y \ ^{3}H^{\circ}$ $a \ ^{5}F - z \ ^{5}G^{\circ}$ $z \ ^{7}F^{\circ} - e \ ^{7}F$ $z \ ^{7}F^{\circ} - e \ ^{7}G$	3—3 5—5 5—6 5—5 6—7
3570,0996 3565,3807 3558,5170 3556,883 3554,929	100 60 30 7 40	0,91 0,96 0,99 2,85 2,83	4,39 4,44 4,47 6,34 6,32	$a \ ^{5}F - z \ ^{3}G^{\circ}$ $z \ ^{7}F^{\circ} - f \ ^{5}F$ $z \ ^{7}F^{\circ} - e \ ^{7}G$	4—5 3—4 2—3 4—5 5—6
3553,741 3542,078 3541,086	6 15 15	3,57 2,85 2,85	7,06 6,37 6,35	$a {}^{1}H - v {}^{1}G^{\circ}$ $z {}^{7}F^{\circ} - e {}^{7}G$ $z {}^{7}F^{\circ} - e {}^{7}G$	5-4 3-4 4-5

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λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
3540 ,118 3536 ,557	3 15	2,86 2,88	6,37 6,38	z ⁷ F°—g ⁵ D z ⁷ F°—e ⁷ G	3-4 2-3
3533,202 3529,820 3527,797 3526,1676 3521,2630 3513,8196 3497,8420 3497,108	10 6 4 15 25 30 40 10	2,89 2,89 2,85 0,95 0,91 0,86 0,11 2,18	6,39 6,39 6,37 4,47 4,44 4,39 3,65 5,72	$z {}^{7}F^{\circ} - e {}^{7}G$ $z {}^{7}F^{\circ} - e {}^{7}G$ $z {}^{7}F^{\circ} - e {}^{7}G$ $a {}^{5}F - z {}^{3}G^{\circ}$ $a {}^{5}F - z {}^{3}G^{\circ}$ $a {}^{5}F - z {}^{3}G^{\circ}$ $a {}^{5}D - z {}^{5}P^{\circ}$ $a {}^{5}P - w {}^{5}P^{\circ}$	1-2 1-1 4-4 3-3 4-4 5-5 1-2 3-3
3495 ,2879 3490 ,5749	8 100	$\overset{2,56}{0,05}$	6,10 $3,60$	b ³ F-w ³ F° a ⁵ D-z ⁵ P°	4—3 3—3
3485,3418 3476,7036 3475,651 3475,4511 3471,3460	$7 \\ 40 \\ 6 \\ 70 \\ 6$	2,20 0,12 2,18 0,09 2,27	5,75 3,68 5,72 3,65 5,83	$a\ ^{5}P-w\ ^{5}P^{\circ}\ a\ ^{5}D-z\ ^{5}P^{\circ}\ a\ ^{5}P-w\ ^{5}P^{\circ}\ a\ ^{5}D-z\ ^{5}P^{\circ}\ a\ ^{3}P-u\ ^{5}D^{\circ}$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 3-2 \\ 2-2 \\ 2-1 \end{array} $
3465,8621 3452,2760 3451,9166 3450,3304 3447,2797	60 10 10 10 10 8	0,11 0,96 2,22 2,22 2,20	3,68 4,55 5,81 5,81 5,79	a ⁵ D-z ⁵ P° a ⁵ F-y ³ F° a ⁵ P-u ⁵ D° a ⁵ P-y ³ P° a ⁵ P-y ³ P°	$ \begin{array}{r} 1 - 1 \\ 3 - 4 \\ 1 - 2 \\ 1 - 1 \\ 2 - 2 \end{array} $
3445,1508 3443,8775 3440,9899 3440,6069 3428,1948	20 50 75 150 8	2,20 0,09 0,05 0,00 2,20	5,79 3,68 3,65 3,60 5,81	$a \ ^{5}P - u \ ^{5}D^{\circ}$ $a \ ^{5}D - z \ ^{5}P^{\circ}$ $a \ ^{5}P - u \ ^{5}D^{\circ}$	2-3 2-1 3-2 4-3 2-2
3427 ,1213 3424 ,2861 3422 ,6583 3418 ,512 3417 ,8428	20 10 7 10 12	2,18 2,18 2,22 2,22 2,22	5,79 5,79 5,84 5,84 5,84	$a\ ^5P-u\ ^5D^{\circ} \ a\ ^5P-u\ ^5D^{\circ} \ a\ ^5P-w\ ^3D^{\circ} \ a\ ^5P-u\ ^5D^{\circ} \ a\ ^5P-u\ ^5D^{\circ} \ a\ ^5P-u\ ^5D^{\circ}$	$ \begin{array}{r} 3-4 \\ 3-3 \\ 1-2 \\ 1-0 \\ 1-1 \end{array} $
3413,1339 3407,4611 3406,8021 3404,3557 3402,262	15 20 6 6 5	2,20 2,18 2,22 2,20 3,23	5,82 5,81 5,86 5,83 6,88	$a\ ^{5}P-w\ ^{3}D^{\circ} \ a\ ^{5}P-x\ ^{3}F^{\circ} \ a\ ^{5}P-w\ ^{3}D^{\circ} \ a\ ^{5}P-x\ ^{3}F^{\circ} \ b\ ^{3}H-v\ ^{3}H^{\circ}$	$ \begin{array}{r} 2-3 \\ 3-4 \\ 4-1 \\ 2-3 \\ 6-6 \end{array} $
3401,5200 3399,3356 3396,9774 3394,5854 3392,6540	6 15 4 5 15	0,91 2,20 0,96 2,20 2,18	4,56 5,84 4,60 5,84 5,82	$a\ ^{5}F-y\ ^{5}P^{\circ}\ a\ ^{5}P-w\ ^{3}D^{\circ}\ a\ ^{5}F-y\ ^{5}P^{\circ}\ a\ ^{5}P-u\ ^{3}D^{\circ}\ a\ ^{5}P-w\ ^{3}D^{\circ}$	4-3 2-2 3-2 2-1 3-3
3392,3058 3383,9808 3380,1117 3379,0206 3378,685	8 8 8 6 6	2,20 2,18 2,76 2,17 2,69	5,85 5,83 6,42 5,83 6,36	$a\ ^{5}P-x\ ^{3}F^{\circ}\ a\ ^{5}P-x\ ^{3}F^{\circ}\ a\ ^{3}G-u\ ^{3}G^{\circ}\ a\ ^{5}P-w\ ^{3}D^{\circ}\ a\ ^{3}G-v\ ^{3}F^{\circ}$	2—2 3—3 3—3 3—2 5—4
3370,7852 3369,549 3355,2287 3347,9271 3341,905	10 8 6 6 5	2,69 2,73 3,30 2,28 2,68	6,37 6,41 7,00 5,98 6,38	$a\ ^{3}G-u\ ^{3}G^{\circ}\ a\ ^{3}G-u\ ^{3}G^{\circ}\ b\ ^{3}H-u\ ^{3}H^{\circ}\ a\ ^{3}P-v\ ^{5}F^{\circ}\ a\ ^{3}G-6^{\circ}$	5—5 4—4 4—4 2—2 5—5
3340,5666 3337,6664 3335,7699 3334,2201 3331,613	6 6 4 4 4	2,28 2,69 2,84 2,43 2,43	5,98 6,41 6,56 6,14 6,15	$a\ ^{3}P-x\ ^{3}P^{\circ}\ a\ ^{3}G-u\ ^{3}G^{\circ}\ b\ ^{3}P-v\ ^{3}P^{\circ}\ a\ ^{3}H-y\ ^{3}H^{\circ}\ a\ ^{3}H-v\ ^{3}G^{\circ}$	$ \begin{array}{r} 2-2 \\ 5-4 \\ 1-2 \\ 5-5 \\ 5-4 \end{array} $
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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
3328,8667 3325,462 3324,5385 3323,7375 3322,477	5 4 4 7 5	3,26 2,45 2,40 2,82 2,94	6,99 6,17 6,13 6,56 6,67	$b\ ^{3}H-u\ ^{3}II^{\circ}$ $a\ ^{3}H-v\ ^{3}G^{\circ}$ $a\ ^{3}H-v\ ^{3}G^{\circ}$ $b\ ^{3}P-v\ ^{3}P^{\circ}$ $z\ ^{7}P^{\circ}-g\ ^{7}D$	5-5 4-3 6-5 2-2 4-5
3317,121 3314,7420 3310,342 3306,498 3306,354	$\begin{array}{c} 4 \\ 7 \\ 4 \\ 6 \\ 20 \end{array}$	2,28 3,30 2,95 2,27 2,22	6,01 7,04 6,68 6,00 5,97	$a\ ^{3}P-x\ ^{3}P^{\circ}\ a\ ^{3}D-u\ ^{3}F^{\circ}\ b\ ^{3}G-t\ ^{3}G^{\circ}\ a\ ^{3}P-u\ ^{5}D^{\circ}\ a\ ^{5}P-v\ ^{5}P^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 5-5 \\ 2-2 \\ 1-2 \end{array} $
3305,9719 3298,1331 3292,5910 3292,023 3290,9899	20 6 8 8 5	2,20 2,22 2,22 3,25 2,22	5,94 5,98 5,98 7,02 5,98	a ⁵ P-v ⁵ P° a ⁵ P-v ⁵ F° a ⁵ P-v ⁵ P° a ³ D-u ³ F° a ⁵ P-x ³ P°	$ \begin{array}{r} 2-3 \\ 1-2 \\ 1-1 \\ 3-4 \\ 1-2 \end{array} $
3286 ,7541 3284 ,5888 3280 ,2613 3278 ,734 3276 ,4713	20 5 8 4 4	2,18 2,20 3,30 2,42 2,20	5,94 5,97 7,08 6,20 5,98	a ⁵ P-v ⁵ P° a ⁵ P-v ⁵ P° b ³ H-x ³ I° a ³ P-w ³ P° a ⁵ P-v ⁵ F°	$ \begin{array}{r} 3-3 \\ 2-2 \\ 4-5 \\ 1-1 \\ 2-2 \end{array} $
3271,0014 3268,236 3265,6182 3265,0473 3259,994	15 5 15 8 6	2,20 2,22 2,18 0,09 2,45	5,98 6,01 5,97 3,89 6,24	$a\ ^{5}P-v\ ^{5}P^{\circ}\ a\ ^{5}P-x\ ^{3}P^{\circ}\ a\ ^{5}P-v\ ^{5}P^{\circ}\ a\ ^{5}D-z\ ^{3}D^{\circ}\ z\ ^{7}D^{\circ}-f\ ^{5}D$	2—1 1—1 3—2 2—3 3—4
3257,5940 3254,3628 3253,602 3251,235 3248,206	8 10 4 8 10	2,18 3,27 3,25 2,20 2,45	5,98 7,08 7,06 6,00 6,26	$a\ ^{5}P-v\ ^{5}F^{\circ}\ b\ ^{3}H-x\ ^{3}I^{\circ}\ a\ ^{3}D-v\ ^{1}G^{\circ}\ a\ ^{5}P-w\ ^{3}G^{\circ}\ z\ ^{7}D^{\circ}-f\ ^{5}D$	3-2 5-6 3-4 2-3 3-3
3246,962 3246,005 3244,190 3239,436 3236,2231	6 8 5 15 8	2,20 0,11 2,42 2,42 0,05	6,01 3,93 6,24 6,24 3,88	$a \ ^{5}P - x \ ^{3}P^{\circ}$ $a \ ^{5}D - z \ ^{3}D^{\circ}$ $z \ ^{7}D^{\circ} - f \ ^{7}D$ $z \ ^{7}D^{\circ} - f \ ^{5}D$ $a \ ^{5}D - z \ ^{3}F^{\circ}$	$ \begin{array}{r} 2-1 \\ 1-2 \\ 4-5 \\ 4-4 \\ 3-4 \end{array} $
3234,6138 3233,971 3233,054 3230,967 3230,211	7 12 8 10 6	0,05 2,42 3,24 2,45 2,47	3,89 6,25 7,07 6,29 6,31	$a \ ^{5}D-z \ ^{3}D^{\circ} \ z \ ^{7}D^{\circ}-e \ ^{7}P \ b \ ^{3}H-x \ ^{3}I^{\circ} \ z \ ^{7}D^{\circ}-f \ ^{5}D \ z \ ^{7}D^{\circ}-e \ ^{7}P$	$ \begin{array}{r} 3 - 3 \\ 4 - 4 \\ 6 - 7 \\ 3 - 2 \\ 2 - 2 \end{array} $
3228,254 3227,798 3225,789 3222,069 3219,581	5 15 20 20 12	2,47 2,42 2,40 2,40 2,45	6,31 6,26 6,23 6,24 6,30	$z {}^{7}D^{\circ} - f {}^{5}D$ $z {}^{7}D^{\circ} - f {}^{5}D$ $z {}^{7}D^{\circ} - e {}^{7}F$ $z {}^{7}D^{\circ} - f {}^{7}D$ $z {}^{7}D^{\circ} - f {}^{7}D$	2—1 4—3 5—6 5—5 3—4
3217,380 3215,940 3214,3964 3214,040 3211,992	10 12 8 20 10	$2,40 \\ 2,47 \\ 0,09 \\ 2,45 \\ 3,36 \\ 2,40$	6,24 6,33 3,95 6,31 7,22 6,25	$z {}^{7}D^{\circ} - f {}^{5}D$ $z {}^{7}D^{\circ} - f {}^{7}D$ $a {}^{5}D - z {}^{3}F^{\circ}$ $z {}^{7}D^{\circ} - f {}^{7}D$ $z {}^{5}F^{\circ} - g {}^{5}G$ $z {}^{7}D^{\circ} - e {}^{7}P$	5-4 2-2 2-3 3-3 4-5 5-4
3210,834 3210,236 3209,297 3208,475	10 8 12	2,47 2,42 2,42 {2,81 3,42 3,43	6,33 6,29 6,67 7,28 7,29	$z {}^{7}D^{\circ} - f {}^{7}D$ $z {}^{7}D^{\circ} - e {}^{5}G$ $z {}^{7}F^{\circ} - g {}^{7}D$ $z {}^{5}F^{\circ} - g {}^{5}G$ $z {}^{5}F^{\circ} - g {}^{5}G$	$ \begin{array}{c} 2-1 \\ 4-5 \\ 6-5 \\ 2-3 \\ 1-2 \end{array} $
3205,400	15	2,48	6,35	$z^{7}D^{\circ}-e^{7}F$	1—1 457

λ, Â	I	E _H , eV	E _B , eV	Transition	J
3200,475 3199,525 3196,997 3196,930 3193,314	15 15 20 20 8	2,47 2,42 0,05 2,42 2,47	6,34 6,30 3,92 6,30 6,35	$z {}^{7}D^{\circ} - e {}^{7}F$ $z {}^{7}D^{\circ} - f {}^{7}D$ $a {}^{5}D - z {}^{3}D^{\circ}$ $z {}^{7}D^{\circ} - e {}^{7}F$ $z {}^{7}D^{\circ} - e {}^{5}G$	2—3 4—4 3—2 4—5 2—3
3193,2268 3192,802 3191,6599 3188,821 3188,571	10 8 7 7 4	0,00 2,48 0,00 2,48 2,40	3,88 6,36 3,89 6,37 6,29	$a\ ^{5}D-z\ ^{3}F^{\circ}\ z\ ^{7}D^{\circ}-e\ ^{7}F\ a\ ^{5}D-z\ ^{3}D^{\circ}\ z\ ^{7}D^{\circ}-e\ ^{5}G\ z\ ^{7}D^{\circ}-e\ ^{5}G$	4-4 $ 1-2 $ $ 4-3 $ $ 1-2 $ $ 5-5$
3184,8955 3182,9798 3180,7562 3180,226 3178,015	7 4 5 20 10	0,05 2,20 0,09 2,45 2,40	3,95 6,09 3,99 6,35 6,30	$a \ ^{5}D - z \ ^{3}F^{\circ}$ $a \ ^{5}P - v \ ^{3}D^{\circ}$ $a \ ^{5}D - z \ ^{3}F^{\circ}$ $z \ ^{7}D^{\circ} - e \ ^{7}F$ $z \ ^{7}D^{\circ} - f \ ^{7}D$	3—3 2—3 2—2 3—4 5—4
3175,447 3166,438 3165,861 3161,949 3160,658	12 6 4 8 10	2,40 2,56 2,45 2,40 2,42	6,31 6,48 6,37 6,31 6,35	$z {}^{7}D^{\circ} - e {}^{7}F$ $b {}^{3}F - t {}^{3}D^{\circ}$ $z {}^{7}D^{\circ} - e {}^{7}G$ $z {}^{7}D^{\circ} - e {}^{7}G$ $z {}^{7}D^{\circ} - e {}^{7}F$	5—5 4—3 3—4 5—6 4—4
3157,887 3157,040 3156,274 3153,206 3151,351	6 8 5 5 10	2,47 2,42 3,24 2,45 2,73	6,40 6,35 7,17 6,38 6,66	$z {}^{7}D^{\circ}-e {}^{7}S$ $z {}^{7}D^{\circ}-e {}^{7}G$ $z {}^{5}D^{\circ}-i {}^{5}D$ $z {}^{7}D^{\circ}-f {}^{5}F$ $a {}^{3}G-y {}^{1}H^{\circ}$	2—3 4—5 3—3 3—4 4—5
3144,495 3143,9896 3142,453 3140,391 3134,1115	6 5 10	2,47 3,21 2,45 3,24 0,95	6,41 7,45 6,40 7,19 4,91	$z^{7}D^{\circ}-f^{5}F$ $z^{5}D^{\circ}-i^{5}D$ $z^{7}D^{\circ}-e^{7}S$ $z^{5}D^{\circ}-i^{5}D$ $a^{5}F-x^{5}D^{\circ}$	2-2 4-4 3-3 3-2 3-4
3129,3349 3126,175 3125,654 3120,4364 3119,4956		$ \begin{array}{c} 1,49 \\ - \\ 0,99 \\ 2,40 \\ 2,45 \\ 2,43 \end{array} $	5,44 4,95 6,36 6,43 6,41	$a\ ^3F-w\ ^5D^\circ \ -a\ ^5F-x\ ^5D^\circ \ z\ ^7D^\circ-e\ ^7G \ a\ ^3H-u\ ^3G^\circ \ a\ ^3H-u\ ^3G^\circ$	4—3 — 2—3 5—4 4—3 5—4
3116,6337 3100,6667 3100,3054 3099,9695 3099,8968	$\begin{array}{c} 20 \\ 20 \\ 15 \end{array}$	1,01 0,96 0,99 0,91 1,01	4,99 4,95 4,99 4,91 5,01	$a\ ^{5}F-x\ ^{5}D^{\circ}\ a\ ^{5}F-x\ ^{5}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 3-3 \\ 2-2 \\ 4-4 \\ 1-1 \end{array} $
3098 ,192 3091 ,5786 3083 ,7430 3078 ,018 3075 ,7214	$\begin{array}{cc} 20 \\ 4 \end{array}$	2,69 1,01 0,99 0,96 0,96	6,69 5,02 5,01 4,98 4,99	$a\ {}^{3}G-t\ {}^{3}G^{\circ} \ a\ {}^{5}F-x\ {}^{5}D^{\circ} \ a\ {}^{5}F-x\ {}^{5}D^{\circ} \ a\ {}^{5}F-y\ {}^{7}D^{\circ} \ a\ {}^{5}F-x\ {}^{5}D^{\circ}$	5—5 1—0 2—1 3—3 3—2
3068,1749 3067,2457 3067,1196 3059,0871 3057,4471	30 8 100	1,61 0,91 1,61 0,05 0,86	5,65 4,95 5,65 4,11 4,91	$a\ ^{3}F$ — $x\ ^{3}D^{\circ}$ $a\ ^{5}F$ — $x\ ^{5}D^{\circ}$ $a\ ^{3}F$ — $y\ ^{3}G^{\circ}$ $a\ ^{5}D$ — $y\ ^{5}D^{\circ}$ $a\ ^{5}F$ — $x\ ^{5}D^{\circ}$	2—1 4—3 2—3 3—4 5—4
3055,2638 3053,070 3047,6060 3045,078 3042,6667	5 100 5	1,56 2,42 0,09 0,91 0,99	5,62 6,49 4,16 4,98 5,06	$a\ ^{3}F-x\ ^{3}D^{\circ}\ a\ ^{3}P-u\ ^{3}D^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}F-y\ ^{7}P^{\circ}\ a\ ^{5}F-x\ ^{5}F^{\circ}$	3-2 1-2 2-3 4-3 2-3
3042,0215 3041,7401	5 15 15	1,01 0,96	5,08 5,03	a ⁵ F—x ⁵ F° a ⁵ F—x ⁵ F°	1—2 3—4

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
3041 ,6396 3040 ,4281 3037 ,3901	10 15 80	1,56 0,91 0,11	5,62 4,99 4,1 9	$a\ {}^{3}F-y\ {}^{3}G^{\circ}\ a\ {}^{5}F-x\ {}^{5}F^{\circ}\ a\ {}^{5}D-y\ {}^{5}D^{\circ}$	3-4 4-5 1-2
3031,639 3031,215 3030,1494 3026,4637 3025,8442	15 12 15 15 50	1,01 2,45 2,43 0,99 0,12	5,10 6,54 6,53 5,08 4,22	$a\ ^{5}F{-}x\ ^{5}F^{\circ}\ a\ ^{3}H{-}w\ ^{3}H^{\circ}\ a\ ^{3}H{-}w\ ^{3}H^{\circ}\ a\ ^{5}F{-}x\ ^{5}F^{\circ}\ a\ ^{5}D{-}y\ ^{5}D^{\circ}$	11 44 55 22 01
3025,638 3024,0337 3021,0743 3020,6405 3020,4918	200	2,40 0,11 0,05 0,00 0,09	6,50 4,21 4,16 4,11 4,19	$a\ ^{3}H-w\ ^{3}H^{\circ}\ a\ ^{5}D-z\ ^{3}P^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}$	6-6 1-2 3-3 4-4 2-2
3018,9848 3017,6288 3016,185 3011,482 3009,5707	15 12 7 25	0,96 0,11 0,99 2,76 0,91	5,06 4,22 5,10 6,87 5,03	$a \ ^{5}F - x \ ^{5}F^{\circ}$ $a \ ^{5}D - y \ ^{5}D^{\circ}$ $a \ ^{5}F - x \ ^{5}F^{\circ}$ $a \ ^{3}G - v \ ^{3}H^{\circ}$ $a \ ^{5}F - x \ ^{5}F^{\circ}$	3—3 1—1 2—1 3—4 4—4
3008, 4399 3007, 1469 3003, 0323 3000, 9489 3000, 4527	8 10 100	0,11 1,48 0,96 0,09 1,48	4,23 5,60 5,08 4,22 5,61	$a \ ^{5}D - y \ ^{5}D^{\circ}$ $a \ ^{3}F - x \ ^{3}D^{\circ}$ $a \ ^{5}F - x \ ^{5}F^{\circ}$ $a \ ^{5}D - y \ ^{5}D^{\circ}$ $a \ ^{3}F - y \ ^{3}G^{\circ}$	1-0 4-3 3-2 2-1 4-5
2999,5125 2994,4281 2994,385 2991,637 2990,3933	100 5 5	$ 0,86 \\ 0,05 \\ 2,42 \\ - \\ 2,73 $	4,99 4,19 6,56 — 6,87	a ⁵ F-x ⁵ F° a ⁵ D-y ⁵ D° a ³ P-v ³ P° - a ³ G-v ³ H°	5-5 3-2 1-2 - 4-5
2987,2923 2986,4569 2984,785 2983,5714 2981,854	3 10	0,91 0,11 0,86 0,00 2,18	5,06 4,26 5,01 4,16 6,34	$a \ ^{5}F$ — $x \ ^{5}F^{\circ}$ $a \ ^{5}D$ — $z \ ^{3}P^{\circ}$ $a \ ^{5}F$ — $y \ ^{7}P^{\circ}$ $a \ ^{5}D$ — $y \ ^{5}D^{\circ}$ $a \ ^{5}P$ — $t \ ^{5}D^{\circ}$	4-3 1-1 5-4 4-3 3-4
2981,4459 2980,539 2976,131 2973,2368 2973,1336	5 5 8 60	0,05 2,76 2,28 0,05 0,09	4,21 6,92 6,45 4,22 4,26	$a \ ^{5}D-z \ ^{3}P^{\circ}$ $a \ ^{3}G-w \ ^{1}F^{\circ}$ $a \ ^{3}P-u \ ^{3}D^{\circ}$ $a \ ^{5}D-y \ ^{5}F^{\circ}$ $a \ ^{5}D-y \ ^{5}F^{\circ}$	3-2 3-3 2-3 3-4 2-3
2972,279 2970,406 2969,4759 2969,3606 2966,8997	5	2,20 0,11 0,86 0,11 0,00	6,36 4,28 5,03 4,28 4,18	$a \ ^{5}P - t \ ^{5}D^{\circ}$ $a \ ^{5}D - y \ ^{5}F^{\circ}$ $a \ ^{5}F - x \ ^{5}F^{\circ}$ $a \ ^{5}D - z \ ^{3}P^{\circ}$ $a \ ^{5}D - y \ ^{5}F^{\circ}$	2-3 1-2 5-4 1-0 4-5
2965 ,2561 2959 ,9929 2959 ,682 2957 ,3660 2954 ,6543	9 10 5 0 30	0,12 2,69 2,81 0,11 2,28	4,30 6,88 7,00 4,30 6,48	$a\ ^{5}D-y\ ^{5}F^{\circ}\ a\ ^{3}G-v\ ^{3}H^{\circ}\ z\ ^{7}F^{\circ}-1\ a\ ^{5}D-y\ ^{5}F^{\circ}\ a\ ^{3}P-t\ ^{3}D^{\circ}$	0-1 5-6 6-5 1-1 2-3
2953 ,9411 2953 ,486 2950 ,243 2947 ,8773 2941 ,3438	5 20 3 60	0,09 2,76 2,17 0,05 0,09	4,28 6,95 6,37 4,26 4,30	$a\ ^{5}D-y\ ^{5}F^{\circ}\ a\ ^{3}G-s\ ^{3}G^{\circ}\ a\ ^{5}P-5^{\circ}\ a\ ^{5}D-y\ ^{5}F^{\circ}\ a\ ^{5}D-y\ ^{5}F^{\circ}$	2-2 3-3 3-3 3-3 2-1
2937 ,811 2936 ,9049 2929 ,121 2929 ,008 2923 ,852	6	2,20 0,00 3,31 0,05 2,69	6,41 4,22 7,54 4,28 6,93	a ⁵ P-7° a ⁵ D-y ⁵ F° b ³ H-t ³ H° a ⁵ D-y ⁵ F° a ³ G-s ³ G°	2-2 4-4 4-4 3-2 5-5

λ, Ä	I	E_{H} , eV	E _B , eV	Transition	J
2920,6915	5	2,48	6,72	$a \ ^{3}P-t \ ^{5}P^{\circ}$ $b \ ^{3}H-t \ ^{3}H^{\circ}$ $a \ ^{5}D-y \ ^{5}F^{\circ}$ $a \ ^{3}G-u \ ^{3}H^{\circ}$ $z \ ^{7}D^{\circ}-g \ ^{7}D$	0—1
2918,023	10	3,24	7,48		6—6
2912,1589	20	0,00	4,26		4—3
2907,520	5	2,73	6,99		4—5
2901,915	5	2,40	6,67		5—5
2901,3820 2898,355 2895,036 2894,5055 2887,807	5 5 8 10 5	1,56 1,56 2,28 2,68	5,82 5,84 6,56 6,98	$a \ ^{3}F - w \ ^{3}D^{\circ}$ $- \ a \ ^{3}F - x \ ^{3}F^{\circ}$ $\cdot \ a \ ^{3}P - v \ ^{3}P^{\circ}$ $\cdot \ a \ ^{3}G - u \ ^{3}H^{\circ}$	$ \begin{array}{r} 3-3 \\ -3 \\ 3-3 \\ 2-2 \\ 5-6 \end{array} $
2877,3021	8	1,48	5,79	$a\ ^{3}F-u\ ^{5}D^{\circ}$ $a\ ^{3}F-u\ ^{5}D^{\circ}$ $a\ ^{5}D-z\ ^{5}G^{\circ}$ $a\ ^{5}F-x\ ^{5}P^{\circ}$ $a\ ^{5}D-z\ ^{5}G^{\circ}$	4-4
2875,3034	5	1,48	5,79		4-3
2874,173	10	0,00	4,31		4-5
2872,3346	7	0,96	5,27		3-3
2869,3083	10	0,05	4,37		3-4
2866,6264 2863,8644 2863,4311 2858,8970 2851,7979	7 8 8 5 45	0,99 0,09 1,48 0,11 1,01	5,31 4,42 5,81 4,45 5,35	$a \ ^{5}F - x \ ^{5}P^{\circ}$ $a \ ^{5}D - z \ ^{5}G^{\circ}$ $a \ ^{3}F - x \ ^{3}F^{\circ}$ $a \ ^{5}D - z \ ^{5}G^{\circ}$ $a \ ^{5}D - z \ ^{5}G^{\circ}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 4-4 \\ 1-2 \\ 1-2 \end{array} $
2845,5959	8	0,95	5,31	$a \ ^{5}F - x \ ^{5}P^{\circ}$ $a \ ^{5}F - y \ ^{5}G^{\circ}$ $a \ ^{5}F - x \ ^{5}P^{\circ}$ $a \ ^{5}D - z \ ^{5}G^{\circ}$ $a \ ^{5}F - y \ ^{5}G^{\circ}$	3-2
2843,9775	20	0,99	5,35		2-3
2843,6314	10	0,91	5,27		4-3
2840,4229	6	0,05	4,42		3-3
2838,1205	10	0,99	5,35		2-2
2835,4574	6	0,00	4,37	$a \ ^{5}D-z \ ^{5}G^{\circ}$ $a \ ^{5}F-y \ ^{5}G^{\circ}$ $a \ ^{5}F-z \ ^{5}H^{\circ}$ $a \ ^{5}D-z \ ^{3}G^{\circ}$ $a \ ^{5}D-z \ ^{3}G^{\circ}$	4-4
2832,4364	25	0,96	5,33		3-4
2828,8094	7	0,99	5,37		2-3
2827,8931	5	0,05	4,43		3-4
2825,687	6	0,00	4,39		4-5
2825,557 2823,2767 2817,5047 2813,2877 2806,985	20 20 6 30 20	0,96 0,96 0,96 0,91 0,91	5,34 5,35 5,35 5,32 5,33	$a\ ^{5}F-z\ ^{5}H^{\circ}\ a\ ^{5}F-y\ ^{5}G^{\circ}\ a\ ^{5}F-y\ ^{5}G^{\circ}\ a\ ^{5}F-y\ ^{5}G^{\circ}\ a\ ^{5}F-z\ ^{5}H^{\circ}$	$ \begin{array}{r} 3-4 \\ 3-3 \\ 3-2 \\ 4-5 \\ 4-5 \end{array} $
2804 ,5212	20	0,91	5,33	$a\ ^{5}F-y\ ^{5}G^{\circ}\ a\ ^{5}F-z\ ^{5}H^{\circ}\ a\ ^{5}F-y\ ^{5}G^{\circ}\ a\ ^{3}F-x\ ^{3}G^{\circ}\ a\ ^{5}F-y\ ^{5}G^{\circ}$	4-4
2797 ,7765	15	0,91	5,34		4-4
2788 ,105	30	0,86	5,30		5-6
2787 ,9331	5	1,49	5,93		4-5
2778 ,2214	20	0,86	5,32		5-5
2772,4107	20	0,09	4,56	$a\ ^5D-y\ ^5P^\circ \ a\ ^3H-v\ ^3H^\circ \ a\ ^5F-w\ ^5F^\circ \ a\ ^5F-w\ ^5D^\circ \ a\ ^5F-w\ ^5D^\circ$	2—3
2769,2985	6	2,41	6,88		6—6
2767,5232	20	0,91	5,39		4—4
2763,108	4	0,99	5,47		2—3
2762,0275	15	0,96	5,44		3—3
2761 ,785	18	2,42	6,90	$a\ ^{3}P-w\ ^{1}D^{\circ} \ a\ ^{5}F-w\ ^{5}F^{\circ} \ a\ ^{5}F-w\ ^{5}D^{\circ} \ a\ ^{5}D-y\ ^{5}P^{\circ} \ a\ ^{5}D-y\ ^{3}F^{\circ}$	1-2
2759 ,817	5	1,01	5,50		1-1
2757 ,3170	10	1,01	5,50		1-1
2756 ,3295	20	0,11	4,61		1-2
2756 ,2677	20	0,05	4,55		3-4
2750 ,878	5	2,17	6,68	$a\ ^{5}P-10^{\circ} \\ a\ ^{5}D-y\ ^{5}P^{\circ} \\ a\ ^{5}F-z\ ^{5}H^{\circ} \\ a\ ^{5}F-w\ ^{5}D^{\circ} \\ a\ ^{5}D-y\ ^{5}P^{\circ}$	3-3
2750 ,1415	25	0,05	4,56		3-3
2746 ,982	20	0,87	5,38		5-6
2744 ,5287	8	0,99	5,50		2-1
2744 ,0691	10	0,12	4,64		0-1
2742,4064 2742,2554 2737,3108	30 20 20	0,09 0,95 0,11	4,61 5,47 4,64	$a \ ^{5}D - y \ ^{5}P^{\circ}$ $a \ ^{5}F - w \ ^{5}D^{\circ}$ $a \ ^{5}D - y \ ^{5}P^{\circ}$	$ \begin{array}{c} 2-2 \\ 3-2 \\ 1-1 \end{array} $

λ, Α	I	E _H , eV	E _B , eV	Transition	J
2735,614 2735,4762	8 8	$\substack{2,20\\0,91}$	6,73 5,44	$a~^5P-t~^5P^\circ \ a~^5F-w~^5D^\circ$	2—1 4—3
2733,5816 2728,0212 2726,054 2724,9542 2723,5786	15 5 6 10 15	0,86 0,91 1,01 0,95 0,09	5,39 5,45 5,58 5,50 4,64	$a\ ^{5}F-w\ ^{5}D^{\circ}\ a\ ^{5}F-w\ ^{5}F^{\circ}\ a\ ^{5}F-v\ ^{5}D^{\circ}\ a\ ^{5}F-v\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}$	5-4 4-4 1-0 3-4 2-1
2720,9035	40	0,05	4,61	$a \stackrel{5}{D} - y \stackrel{5}{P}^{\circ}$	$\begin{array}{c} 3-2 \\ 4-3 \end{array}$
2719,025 2718,4365 2711,6560 2707,507	$ \begin{array}{c} 60 \\ 6 \\ 4 \\ 20 \end{array} $	$ \left\{ \begin{array}{c} 0,00 \\ 2,59 \\ 0,99 \\ 0,91 \\ - \end{array} \right. $	4,56 7,15 5,55 5,48	$a\ ^5D-y\ ^5P^\circ \ b\ ^3F-t\ ^3F^\circ \ a\ ^5F-v\ ^5D^\circ \ a\ ^5F-w\ ^5F^\circ \ -$	3-3 2-1 4-5
2706,5829 2699,1075 2696,284 2694,538 2689,2130	8 6 5 5 8	0,96 0,91 2,41 2,39 0,91	5,53 5,50 7,00 6,99 5,52	$a {}^{5}F - v {}^{5}D^{\circ}$ $a {}^{5}F - v {}^{5}D^{\circ}$ $z {}^{7}D^{\circ} - 1$ $z {}^{7}D^{\circ} - 2$ $a {}^{5}F - v {}^{5}D^{\circ}$	3-2 4-4 5-5 5-4 4-3
2679,0626 2666,8133 2647,5588 2644,000 2641,6468	10 8 5 8 4	0,86 0,86 0,05 1,01 0,91	5,48 5,50 4,73 5,70 5,60	$a\ ^{5}F-w\ ^{5}F^{\circ}\ a\ ^{5}F-v\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{3}D^{\circ}\ a\ ^{5}F-x\ ^{5}G^{\circ}\ a\ ^{5}F-x\ ^{3}D^{\circ}$	5—5 5—4 3—3 1—2 4—3
2635,8100 2632,2382 2629,587 2623,532 2618,0191	8 4 5 5 5	0,99 0,99 0,12 0,96 0,96	5,69 5,70 4,83 5,68 5,69	$a\ ^{5}F-x\ ^{5}G^{\circ}\ a\ ^{5}F-x\ ^{5}G^{\circ}\ a\ ^{5}D-y\ ^{3}D^{\circ}\ a\ ^{5}F-x\ ^{5}G^{\circ}\ a\ ^{5}F-x\ ^{5}G^{\circ}$	2-3 2-2 0-1 3-4 3-3
2606 ,8286 2605 ,6578 2599 ,570 2587 ,999 2584 ,5370	6 6 8 8	$ 0,91 \\ 0,86 \\ 0,91 \\ \\ 0,86 $	5,66 5,61 5,68 — 5,65	$a \ {}^{5}F - x \ {}^{5}G^{\circ}$ $a \ {}^{5}F - y \ {}^{3}G^{\circ}$ $a \ {}^{5}F - x \ {}^{5}G^{\circ}$ $a \ {}^{5}F - x \ {}^{5}G^{\circ}$ $a \ {}^{5}F - x \ {}^{5}G^{\circ}$	4—5 5—5 4—4 — 5—6
2582,299 2569,601 2553,193 2551,094 2549,6142	6 6 7 8 10	0,86 — — 0,05	5,68 - 4,91	a ⁵ F-x ⁵ G° - a ⁵ D-x ⁵ D°	5-4 3-4
2545,9795 2543,920 2542,101 2540,9734 2539,3576	10 6 6 10 7	0,09 2,60 2,61 0,11 0,91	4,95 7,46 7,48 4,99 5,79	$a\ ^5D-x\ ^5D^{\circ}\ b\ ^3F-r\ ^3G^{\circ}\ b\ ^3F-r\ ^3G^{\circ}\ a\ ^5D-x\ ^5D^{\circ}\ a\ ^5F-u\ ^5D^{\circ}$	2-3 3-4 2-3 1-2 4-3
2535,6086 2529,1361 2527,4358 2527,16 2525,022	8 10 15 5 7	0,12 0,09 0,05 —	5,01 4,99 4,95 —	a ⁵ D-x ⁵ D° a ⁵ D-x ⁵ D° a ⁵ D-x ⁵ D° -	0-1 2-2 3-3 -
2524,2939 2523,658 2523,11 2522,8505 2522,488	$egin{array}{c} 8 \\ 6 \\ 5 \\ 40 \\ 6 \end{array}$	0,11 <u>-</u> 0,00 0,91	5,02 - 4,91 5,82	$a \ ^{5}D - x \ ^{5}D^{\circ}$ $ a \ ^{5}D - x \ ^{5}D^{\circ}$ $a \ ^{5}F - z \ ^{3}H^{\circ}$	1—0 — — 4—4 4—5
2521,9197 2519,6305 2518,1029 2517,659 2512,363	7 10 12 8 5	0,91 1,01 0,09 0,99 0,05	5,83 5,92 5,01 5,91 4,98	$a {}^{5}F - w {}^{3}D^{\circ}$ $a {}^{5}F - w {}^{5}G^{\circ}$ $a {}^{5}D - x {}^{5}D^{\circ}$ $a {}^{5}F - w {}^{5}G^{\circ}$ $a {}^{5}D - y {}^{7}P^{\circ}$	4-3 1-2 2-1 2-3 3-3

λ, Å	I	$E_{_{ m H}},~{ m eV}$	E _B , eV	Transition	J
2510,8362	15	0,05	4,99	$a\ ^5D-x\ ^5D^{\circ}\ a\ ^5F-w\ ^5G^{\circ}\ -\ a\ ^5D-x\ ^5D^{\circ}\ a\ ^5D-y\ ^7P^{\circ}$	3—2
2507,899	6	0,95	5,89		3—4
2505,485	5	—	-		—
2501,1332	20	0,00	4,95		4—3
2498,895	10	0,05	5,01		3—4
2496 ,5343	6	0,91	5,87	$a\ ^{5}F-w\ ^{5}G^{\circ}\ a\ ^{5}F-x\ ^{3}G^{\circ}\ b\ ^{3}F-t\ ^{3}H^{\circ}\ a\ ^{5}D-x\ ^{5}F^{\circ}\ a\ ^{5}D-x\ ^{5}F^{\circ}$	4—5
2493 ,999	6	0,95	5,92		3—4
2491 ,984	8	2,56	7,53		4—4
2491 ,1562	20	0,11	5,08		1—2
2490 ,6454	30	0,09	5,06		2—3
2489,751	15	0,12	5,10	$a\ ^5D-x\ ^5F^\circ \ b\ ^3F-q\ ^3G^\circ \ a\ ^5D-x\ ^5F^\circ \ a\ ^5F-v\ ^5F^\circ \ a\ ^5F-v\ ^5F^\circ$	0-1
2488,950	6	2,56	7,54		4-3
2488,1437	40	0,05	5,03		3-4
2487,064	12	1,01	5,99		1-1
2486,693	10	0,95	5,94		3-4
2486,371 2485,985 2484,187 2483,531 2483,2718	10 10 15 10 60	0,00 0,91 0,11 0,99 0,00	4,96 5,89 5,10 5,98 4,99	$a\ ^5D-y\ ^7P^\circ \ a\ ^5F-w\ ^5G^\circ \ a\ ^5D-x\ ^5F^\circ \ a\ ^5D-x\ ^5F^\circ \ a\ ^5D-x\ ^5F^\circ \ $	$ \begin{array}{r} 4-3 \\ 4-4 \\ 1-1 \\ 2-2 \\ 4-5 \end{array} $
2479 ,7774	20	0,09	5,08	$a\ ^5D-x\ ^5F^{\circ}\ a\ ^5F-x\ ^3P^{\circ}\ a\ ^5F-v\ ^5F^{\circ}\ a\ ^5D-x\ ^5F^{\circ}\ a\ ^5D-x\ ^5F^{\circ}$	2—2
2479 ,4813	6	0,99	5,99		2—2
2474 ,8151	8	0,95	5,96		3—3
2472 ,909	12	0,05	5,06		3—3
2472 ,8962	5	0,09	5,10		2—1
2465,150 2463,728 2462,6483 2457,5980 2454,706	6 6 10 6 6	0,92 0,96 0,00 0,86 2,58	5,94 5,99 5,03 5,90 7,43	$a\ ^{5}F-v\ ^{5}F^{\circ}\ a\ ^{5}F-x\ ^{3}P^{\circ}\ a\ ^{5}D-x\ ^{5}F^{\circ}\ a\ ^{5}F-v\ ^{5}F^{\circ}\ b\ ^{3}F-r\ ^{3}G^{\circ}$	4-4 $3-2$ $4-4$ $5-5$ $4-5$
2445,210	6	0,87	5,92	$a\ ^{5}F-x\ ^{3}G^{\circ}\ a\ ^{5}F-x\ ^{3}G^{\circ}\ a\ ^{3}H-t\ ^{3}H^{\circ}\ a\ ^{3}H-t\ ^{3}H^{\circ}\ a\ ^{3}H-t\ ^{3}H^{\circ}$	5—4
2443,8728	20	0,87	5,93		5—5
2442,567	20	2,43	7,50		5—5
2440,107	15	2,46	7,53		4—4
2439,744	25	2,41	7,48		6—6
2436 ,344 2431 ,025 2389 ,9732 2374 ,5192 2373 ,618	10 20 25 10 20			a ⁵ D-x ⁵ P° a ⁵ D-x ⁵ P° a ⁵ D-x ⁵ P°	2-3 0-1 3-3
2371,4313	15	0,09	5,31	$a\ ^5D-x\ ^5P^\circ \ a\ ^5D-x\ ^5P^\circ \ a\ ^5D-x\ ^5P^\circ \ a\ ^5D-w\ ^5D^\circ \ a\ ^5$	2—2
2369,4567	8	0,11	5,34		1—1
2350,408	5	0,00	5,27		4—3
2320,3585	40	0,05	5,39		3—4
2313,1048	40	0,09	5,44		2—3
2308,9999 2304,627 2303,5815 2303,422 2301,6849	30 5 20 15 20	0,11 0,99 0,11 0,12 0,12	5,47 6,37 5,49 5,50 5,50	$a\ ^5D-w\ ^5D^{\circ}\ a\ ^5F-t\ ^5D^{\circ}\ a\ ^5D-w\ ^5F^{\circ}\ a\ ^5D-w\ ^5D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-2 \\ 0-1 \\ 0-1 \end{array} $
2301 ,173 2300 ,139 2299 ,2209 2298 ,662 2298 ,1699	$6 \\ 30 \\ 25 \\ 6 \\ 10$	0,09 0,09 0,11 0,00	5,47 5,47 5,50 5,39	$a\ ^5D-w\ ^5F^\circ \ a\ ^5D-w\ ^5F^\circ \ a\ ^5D-w\ ^5D^\circ \ a\ ^5D-w\ ^5D^\circ \ $	$ \begin{array}{c} -\\ 2-3\\ 2-2\\ 1-1\\ 4-4 \end{array} $
2297 ,7877	35	0,05	5,44	$a\ ^{5}D{-}w\ ^{5}D^{\circ}\ a^{5}D{-}w\ ^{5}D^{\circ}\ a^{5}D{-}w\ ^{5}D^{\circ}$	3—3
2296 ,9279	15	0,11	5,50		1—1
2294 ,406	25	0,11	5,51		1—0

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
2293 ,8482 2292 ,5249	25 30	0,09 0,05	5,49 5,45	$a~^5D$ — $w~^5F^\circ$ $a~^5D$ — $w~^5F^\circ$	2—2 3—4
2291,120 2290,545 2289,031 2287,630 2287,2505	15 9 10 15 30	0,99 0,99 1,01 0,91 0,09	6,40 6,40 6,43 6,33 5,50	$a\ ^{5}F-u\ ^{5}F^{\circ}\ a\ ^{5}F-t\ ^{5}D^{\circ}\ a\ ^{5}F-u\ ^{5}F^{\circ}\ a\ ^{5}F-t\ ^{5}D^{\circ}\ a\ ^{5}D-w\ ^{5}D^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 1 - 2 \\ 4 - 4 \\ 2 - 1 \end{array} $
2284,0864 2283,6557 2283,3045 2283,079 2280,222	40 12 9 9	0,05 0,11 0,12 1,01 0,99	5,47 5,53 5,55 6,44 6,43	$a\ ^5D-w\ ^5D^{\circ} \ a\ ^5D-v\ ^5D^{\circ} \ a\ ^5D-v\ ^5D^{\circ} \ a\ ^5F-t\ ^5D^{\circ} \ a\ ^5F-u\ ^5F^{\circ}$	$ \begin{array}{r} 3-2 \\ 1-2 \\ 0-1 \\ 1-0 \\ 2-2 \end{array} $
2279,924 2277,672 2277,096 2276,0263 2275,187	10 12 9 12 6	0,09 0,95 0,95 0,00 0,11	5,52 6,40 6,40 5,44 5,55	$a\ ^5D-v\ ^5D^\circ \ a\ ^5F-u\ ^5F^\circ \ a\ ^5F-t\ ^5D^\circ \ a\ ^5D-w\ ^5D^\circ \ a\ ^5D-v\ ^5D^\circ \ a\ ^5D^\circ \ a\ ^5D-v\ ^5D^\circ \ a\ ^5D^\circ \$	2-3 3-3 3-2 4-3 1-0
2274,088 2272,816 2272,0703 2271,778 2270,8628	9 8 15 40 18	0,99 0,91 0,05 0,91 0,00	6,44 6,37 5,50 6,37 5,48	$a\ ^{5}F - u\ ^{5}F^{\circ} \ a\ ^{5}F - t\ ^{5}D^{\circ} \ a\ ^{5}D - v\ ^{5}D^{\circ} \ a\ ^{5}F - u\ ^{5}F^{\circ} \ a\ ^{5}D - w\ ^{5}F^{\circ}$	2—1 4—3 3—4 4—4 4—4
2269,0990 2267,466 2267,080 2266,903 2265,0546	18 15 9 10 20	0,09 0,86 0,05 0,95 0,05	5,55 6,32 5,51 6,43 5,52	$a\ ^5D-v\ ^5D^{\circ}\ a\ ^5F-u\ ^5F^{\circ}\ a\ ^5D-y\ ^5S^{\circ}\ a\ ^5F-u\ ^5F^{\circ}\ a\ ^5D-v\ ^5D^{\circ}$	2—1 5—5 3—2 3—2 3—3
2264,390 2263,474 2259,5109 2255,859 2251,8749	45 6 15 45 12	0,86 0,00 0,00 0,91 0,11	6,34 5,47 5,48 6,41 5,61	$a\ ^{5}F-t\ ^{5}D^{\circ}\ a\ ^{5}D-w\ ^{5}F^{\circ}\ a\ ^{5}D-w\ ^{5}F^{\circ}\ a\ ^{5}F-u\ ^{5}P^{\circ}\ a\ ^{5}D-x\ ^{3}D^{\circ}$	54 43 43 12
2250,7911 2248,857 2245,6536 2242,579 2231,2138	15	0,00 0,86 0,09 0,09 0,05	5,50 6,37 5,60 5,61 5,60	$a\ ^5D-v\ ^5D^{\circ}\ a\ ^5F-u\ ^5F^{\circ}\ a\ ^5D-x\ ^3D^{\circ}\ a\ ^5D-x\ ^3D^{\circ}\ a\ ^5D-x\ ^3D^{\circ}$	4-4 5-4 2-3 2-2 3-3
2229,0735 2228,1722 2222,763 2211,2364 2210,6894	10 7 7	0,09 0,05 1,49 0,09 0,00	5,65 5,61 7,06 5,69 5,60	$a\ ^5D-x\ ^3D^{\circ}\ a\ ^5D-x\ ^3D^{\circ}\ a\ ^3F-v\ ^1G^{\circ}\ a\ ^5D-x\ ^5G^{\circ}\ a\ ^5D-x\ ^3D^{\circ}$	$ \begin{array}{r} 2 - 1 \\ 3 - 2 \\ 4 - 4 \\ 2 - 3 \\ 4 - 3 \end{array} $
2207,0692 2200,722 2200,370 2196,0428 2191,838	15 10	0,00 0,11 0,12 0,11 0,09	5,61 5,74 5,75 5,75 5,74	$egin{array}{l} a \ ^5D - y \ ^3G^{\circ} \ a \ ^5D - w \ ^5P^{\circ} \end{array}$	$ \begin{array}{r} 4-5 \\ 1-2 \\ 0-1 \\ 1-1 \\ 2-2 \end{array} $
2191,2052 2187,1950 2186,485 2178,090 2176,8414	40 40 35	0,12 0,09 0,05 0,05 0,12	5,78 5,75 5,72 5,74 5,81	$a \ ^5D - z \ ^3S^{\circ}$ $a \ ^5D - w \ ^5P^{\circ}$ $a \ ^5D - w \ ^5P^{\circ}$ $a \ ^5D - w \ ^5P^{\circ}$ $a \ ^5D - w \ ^3P^{\circ}$	0-1 2-1 3-3 3-2 0-1
2173,2146 2172,581 2171,2976 2166,773 2165,860	_6	0,11 0,11 0,09 0,00	5,81 5,81 5,79 5,72	$a\ ^{5}D-u\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{3}P^{\circ}\ a\ ^{5}D-u\ ^{5}D^{\circ}\ a\ ^{5}D-w\ ^{5}P^{\circ}\ -$	1—2 1—1 2—3 4—3 —

λ, Α	I	$E_{ m H}$, eV	$E_{\mathrm{B}},\;\mathrm{eV}$	Transition	J
2164,547 2163,8633 2163,368 2161,5802 2158,49	7 6 10 5 6	0,09 0,12 - 0,11	5,81 5,85 - 5,84	$a \ ^{5}D - u \ ^{5}D^{\circ}$ $a \ ^{5}D - u \ ^{5}D^{\circ}$ $ a \ ^{5}D - w \ ^{3}D^{\circ}$ $-$	2-2 0-1 - 1-2 -
2157,795	5	0,05	5,79	$a\ ^5D-u\ ^5D^{\circ}\ a\ ^5D-w\ ^3D^{\circ}\ a\ ^5D-w\ ^5G^{\circ}\ a\ ^5D-v\ ^5P^{\circ}\ a\ ^5D-v\ ^5P^{\circ}$	3-3
2153,0075	5	0,09	5,84		2-2
2119,125	5	0,05	5,89		3-4
2115,1697	20	0,09	5,94		2-3
2114,488	25	0,11	5,97		1-2
2113,08 2112,966 2111,274 2110,233 2109,861	20 25 20 30 25	0,86 0,12 — 0,12 —	6,73 5,98 - 5,99	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	5-4 0-1 - 0-1 -
2108,959	30	0,11	5,98	$a\ ^5D-v\ ^5P^{\circ}\ a\ ^5D-x\ ^3P^{\circ}\ a\ ^5D-w\ ^5G^{\circ}\ a\ ^5D-v\ ^5P^{\circ}\ a\ ^5D-v\ ^5F^{\circ}$	1—1
2108,302	12	0,11	5,98		1—2
2108,439	12	0,00	5,87		4—5
2106,380	25	0,09	5,97		2—2
2106,260	20	0,11	5,99		1—1
2103,048	25	0,09	5,98	$a\ ^5D-v\ ^5F^{\circ}\ a\ ^5D-x\ ^3P^{\circ}\ a\ ^5D-v\ ^5P^{\circ}\ a\ ^5D-v\ ^5P^{\circ}\ a\ ^5D-x\ ^3P^{\circ}$	2-2
2102,910	20	0,12	6,01		0-1
2102,3542	30	0,05	5,94		3-3
2100,7984	30	0,09	5,98		2-1
2100,144	10	0,09	5,98		2-2
2098,953	25	0,11	6,01	$a \ ^5D - x \ ^3P^{\circ}$ $a \ ^5D - v \ ^5F^{\circ}$ $a \ ^5D - v \ ^5P^{\circ}$ $a \ ^5D - x \ ^3P^{\circ}$ $a \ ^5D - v \ ^5F^{\circ}$	1-1
2098,081	15	0,09	5,99		2-1
2093,660	40	0,05	5,97		3-2
2090,862	20	0,09	6,01		2-1
2090,380	30	0,05	5,98		3-2
2087,525	25	0,05	5,98	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3—2
2084,117	50	0,00	5,94		4—3
2041,204	25	—	—		—
2017,090	15	—	—		—
2016,512	5	0,91	7,06		4—4
2007,215 2006,260 1980,129 1964,043 1963,629	15 15 25 20 15	 0,00 0,09 0,09	- 6,32 6,40 6,40	$ a \ ^5D-u \ ^5F^{\circ}$ $a \ ^5D-u \ ^5F^{\circ}$ $a \ ^5D-t \ ^5D^{\circ}$	 45 23 22
1963 ,110	25	0,11	6,43	$a\ ^5D-u\ ^5F^{\circ}\ a\ ^5D-t\ ^5D^{\circ}\ a\ ^5D-t\ ^5D^{\circ}\ a\ ^5D-u\ ^5F^{\circ}\ a\ ^5D-u\ ^5F^{\circ}$	1-2
1962 ,871	20	0,05	6,37		3-3
1962 ,746	15	0,11	6,43		1-1
1962 ,100	30	0,05	6,37		3-4
1962 ,031	25	0,12	6,41		0-1
1961,236	20	0,09	6,41	$a\ ^{5}D-u\ ^{5}P^{\circ}\ a\ ^{5}D-u\ ^{5}F^{\circ}\ a\ ^{5}D-t\ ^{5}D^{\circ}\ a\ ^{5}D-u\ ^{5}F^{\circ}\ a\ ^{5}D-t\ ^{5}D^{\circ}$	2-3
1960,129	30	0,00	6,32		4-5
1958,739	45	0,11	6,44		1-0
1958,598	30	0,11	6,44		1-1
1957,831	25	0,00	6,34		4-4
1956,026	30	0,09	6,43	$a\ ^5D-u\ ^5F^\circ \ a\ ^5D-t\ ^5D^\circ \ a\ ^5D-u\ ^5F^\circ \ a\ ^5D-t\ ^5D^\circ \ a\ ^5D-u\ ^5P^\circ \ $	2-2
1955,690	20	0,09	6,43		2-1
1952,997	20	0,05	6,40		3-3
1952,596	30	0,05	6,40		3-2
1952,262	20	0,05	6,46		1-1
1951,556	25	0,09	6,44	$a\ ^{5}D-u\ ^{5}F^{\circ}\ a\ ^{5}D-u\ ^{5}P^{\circ}\ a\ ^{5}D-t\ ^{5}D^{\circ}$	2—1
1950,223	20	0,05	6,41		3—3
1946,978	25	0,00	6,37		4—3

					
λ, Å	I	E _H , eV	E _B , eV	Transition	J
1946 ,219	10	00,00	6,37	$a \ ^5D - u \ ^5F^{\circ}$ $a \ ^5D - u \ ^5P^{\circ}$	4—4
1945 ,294	25	00,00	6,46		2—1
1945,070	20	0,05	6,43	$a \ ^5D-u \ ^5F^{\circ} \ a \ ^5D-u \ ^5F^{\circ} \ a \ ^5D-u \ ^5F^{\circ} \ a \ ^5D-u \ ^5P^{\circ} \ a \ ^5D-y \ ^1F^{\circ}$	3-2
1940,649	25	0,05	6,44		3-2
1937,274	35	0,00	6,40		4-3
1934,528	25	0,00	6,41		4-3
1888,32	12	0,09	6,65		2-3
1887,761	14	0,05	6,62	$a \ ^5D-t \ ^5P^{\circ} \ a \ ^5D-10^{\circ} \ a \ ^5D-t \ ^5P^{\circ} \ a \ ^5D-t \ ^5P^{\circ} \ a \ ^5D-t \ ^5P^{\circ} \ a \ ^5D-t \ ^5P^{\circ}$	3-3
1880,14	5	0,09	6,68		2-3
1876,421	10	0,12	6,73		0-1
1873,259	15	0,11	6,73		1-1
1873,052	12	0,00	6,62		4-3
1872,359	15	0,09	6,71	a ⁵ D-t ⁵ P°	2-2
1866,815	10	0,09	6,73	a ⁵ D-t ⁵ P°	2-1
1866,07	12	0,05	6,70	a ⁵ D-11°	3-3
1862,318	15	0,05	6,71	a ⁵ D-t ⁵ P°	3-2
1855,58	15	0,00	6,68	a ⁵ D-10°	4-3

Fe II, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^6 D_{9/2}$ Ionization potential $130\,524$ cm⁻¹; 6,187 eV

				· ,	
λ, Å	I	E_{H} , eV	E_{B} , eV	Transition	J
7711,73 7515,88 7462,38 7445,34 7376,46	15 6 20 6 20	3,90 3,90 3,88 3,88	5,51 5,55 5,55 5,55	$b\ ^{4}D-z\ ^{4}D^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ -$	7/2 $7/2$ $7/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
7334,66 7320,70 7310,24 7307,957 7287,36	$ \begin{array}{c} 8 \\ 40 \\ 6 \\ 50 \\ 6 \end{array} $	7,26 3,88 3,88 3,88 6,22	8,95 5,58 5,58 5,58 7,92	$d^{2}G - x^{2}H^{\circ}$ $b^{4}D - z^{4}D^{\circ}$ $b^{4}D - z^{4}D^{\circ}$ $b^{4}D - z^{4}D^{\circ}$ $c^{4}F - y^{4}G^{\circ}$	$ \begin{array}{c} 9/2 - 11/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 9/2 - 11/2 \end{array} $
7264,99 7224,51 7222,39 7193,23 7134,99	10 12 8 8 5	6,22 3,88 3,88 6,21 6,20	7,92 5,60 5,60 7,94 7,94	$c\ ^{4}F-y\ ^{4}G^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ b\ ^{4}D-z\ ^{4}D^{\circ}\ c\ ^{4}F-y\ ^{4}G^{\circ}\ c\ ^{4}F-y\ ^{4}G^{\circ}$	7/2 - 9/2 $1/2 - 1/2$ $3/2 - 1/2$ $5/2 - 7/2$ $3/2 - 5/2$
7067,44 6627,28 6588,69 6517,01 6516,053	20 5 5 5 20	7,26 — 2,89	9,14 - 4,79	$d^{2}G - w^{2}H^{\circ}$ $ a^{6}S - z^{6}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6506,33 6493,05 6456,376 6446,43 6442,93	5 8 200 20 6	- 3,90 6,21 -	- 5,82 8,14 -	 b ⁴ D-z ⁴ P° c ⁴ F-x ⁴ G° 	$$ $$ $^{7/2}$ $^{5/2}$ $^{7/2}$ $^{-9/2}$ $-$
6432,654 6416,905 6385,473 6383,753	8 20 5 15	2,89 3,88 — — 6,21	4,82 5,82 — — 8,16	$a {}^{6}S - z {}^{6}D^{\circ} \\ b {}^{4}D - z {}^{4}P^{\circ} \\ - \\ c {}^{4}F - x {}^{4}G^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6331 ,969 6305 ,318 6247 ,562	12 15 80	6,22 3,88	8,17 5,87	$c \stackrel{4}{F} = x \stackrel{4}{G}$ $c \stackrel{4}{F} = x \stackrel{4}{F} \stackrel{\circ}{P}$ $b \stackrel{4}{D} = z \stackrel{4}{P} \stackrel{\circ}{P}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

Α, λ	I	E _H , eV	E _B , eV	Transition	J
6236,375 6179,378 6175,158	20 5 15	3,88 5,56 6,22	5,87 7,56 8,21	$\begin{array}{c} b\ ^4D-z\ ^4P^{\circ} \\ c\ ^2F-z\ ^2D^{\circ} \\ c\ ^4F-x\ ^4F^{\circ} \end{array}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
6149,238 6147,735 6103,54 6084,11 6045,497	20 30 8 5 6	3,88 3,88 6,21 3,20 6,21	5,90 5,90 8,23 5,22 8,24	$b\ ^4D-z\ ^4P^{\circ}\ b\ ^4D-z\ ^4P^{\circ}\ c\ ^4F-x\ ^4F^{\circ}\ a\ ^4G-z\ ^6F^{\circ}\ c\ ^4F-x\ ^4F^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
5991,383 5962,4 5903,6 5891,36 5567,815	10 30 8 8 10	3,15 — 7,27 —	5,22 	$a\ {}^{4}G-z\ {}^{6}F^{\circ} \ - \ d\ {}^{2}G-w\ {}^{2}F^{\circ} \ - \ $	11/2—9/2 — — — 9/2— ⁷ /2
5466,94 5427,832 5362,864 5316,609 5284,092	20 30 5 8 5		5,51 5,48 5,23	$a^{4}G - z^{4}D^{\circ}$ $a^{4}G - z^{4}F^{\circ}$ $a^{6}S - z^{6}F^{\circ}$	$ \begin{array}{c} -\\ -\\ 9/2-7/2\\ 11/2-9/2\\ 5/2-7/2 \end{array} $
5275,994 5234,620 5197,569 5169,030 5156,10	7 7 6 12 6	3,20 3,22 3,23 2,89	5,54 5,59 5,61 5,29	$a\ ^{4}G-z\ ^{4}F^{\circ}\ a\ ^{4}G-z\ ^{4}F^{\circ}\ a\ ^{4}G-z\ ^{4}F^{\circ}\ a\ ^{4}G-z\ ^{4}F^{\circ}\ a\ ^{6}S-z\ ^{6}P^{\circ}\ -$	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$
5136,795 5100,95 5018,434 4923,916 4648,933	6 15 12 12 10	2,84 2,89 2,89 2,58	5,25 - 5,36 5,41 5,25	$b^{4}F - z^{6}F^{\circ}$ $ a^{6}S - z^{6}P^{\circ}$ $a^{6}S - z^{6}P^{\circ}$ $b^{4}P - z^{6}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4629,336 4583,848 4555,890 4549,470 4522,634	7 11 8 10 9	2,80 2,80 2,83 2,83 2,84	5,48 5,51 5,54 5,57 5,60	$b\ ^4F-z\ ^4F^{\circ}\ b\ ^4F-z\ ^4D^{\circ}\ b\ ^4F-z\ ^4F^{\circ}\ b\ ^4F-z\ ^4D^{\circ}\ b\ ^4F-z\ ^4D^{\circ}$	9/2 - 9/2 $9/2 - 7/2$ $7/2 - 7/2$ $7/2 - 5/2$ $5/2 - 3/2$
4520,225 4515,337 4508,283 4491,401 4416,817	7 7 8 5 7	2,80 2,84 2,85 2,85 2,78	5,54 5,59 5,60 5,61 5,58	$b\ {}^4F-z\ {}^4F^\circ\ b\ {}^4F-z\ {}^4F^\circ\ b\ {}^4F-z\ {}^4D^\circ\ b\ {}^4F-z\ {}^4F^\circ\ b\ {}^4P-z\ {}^4D^\circ$	$\begin{array}{c} 9/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array}$
4385,381 4351,764 4303,166 4296,567 4233,168	7 9 8 6 11	2,78 2,70 2,70 2,70 2,58	5,60 5,55 5,58 5,59 5,51	$b\ ^{4}P-z\ ^{4}D^{\circ} \ b\ ^{4}P-z\ ^{4}D^{\circ} \ b\ ^{4}P-z\ ^{4}D^{\circ} \ b\ ^{4}P-z\ ^{4}F^{\circ} \ b\ ^{4}P-z\ ^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4178,855 4173,450 4066,328 4024,552 3759,460	$ \begin{array}{c} 8 \\ 8 \\ 12 \\ 5 \\ 6 \end{array} $	2,58 2,58 7,70 4,50 4,74	5,54 5,55 10,74 7,57 8,03	$b^{4}P - z^{4}F^{\circ} \\ b^{4}P - z^{4}D^{\circ} \\ z^{2}D^{\circ} - e^{4}F \\ b^{2}D - z^{2}D^{\circ} \\ c^{2}D - z^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3748,489 3624,890 3621,273 3614,873 3494,672	8 5 6 5 5	4,73 4,62 4,62 4,16 2,28	8,03 8,03 8,03 7,58 5,82	$c^{2}D-z^{2}P^{\circ} \ a^{2}S-z^{2}P^{\circ} \ a^{2}S-z^{2}P^{\circ} \ c^{2}G-z^{4}H^{\circ} \ a^{2}P-z^{4}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
3493,474 3468,680 3456,928 3436,112 3416,021	10 8 5 5 5	4,15 4,16 3,90 3,96 2,28	7,69 7,72 7,48 7,56 5,90	$c\ ^{2}G-z\ ^{2}G^{\circ}\ c\ ^{2}G-z\ ^{2}G^{\circ}\ b\ ^{4}D-y\ ^{4}P^{\circ}\ b\ ^{2}F-z\ ^{2}D^{\circ}\ a\ ^{2}P-z\ ^{4}P^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
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λ, Å	I	E _H , eV	$E_{_{ m B}},~{ m eV}$	Transition	J
3388,134 3323,068 3297,888 3295,814 3289,347	12 8 5 6 7	3,90 3,97 3,94 1,07 3,81	7,56 7,70 7,70 4,84 7,58	$b^{4}D-z^{4}H^{\circ}$ $b^{2}F-z^{4}G^{\circ}$ $b^{2}F-z^{2}D^{\circ}$ $a^{4}D-z^{6}D^{\circ}$ $b^{2}G-z^{4}H^{\circ}$	7/2 - 9/2 $7/2 - 9/2$ $5/2 - 3/2$ $3/2 - 3/2$ $7/2 - 7/2$
3281,300 3277,346 3276,606 3259,048 3258,773	7 9 5 10 10	1,04 0,98 3,94 3,90 3,89	4,82 4,77 7,72 7,69 7,69	$a\ ^{4}D-z\ ^{6}D^{\circ}\ a\ ^{4}D-z\ ^{6}D^{\circ}\ b\ ^{2}F-z\ ^{2}G^{\circ}\ b\ ^{4}D-y\ ^{4}F^{\circ}\ b\ ^{4}D-y\ ^{4}F^{\circ}$	$ \begin{array}{c} 5/_2 - 5/_2 \\ 7/_2 - 9/_2 \\ 5/_2 - 7/_2 \\ 7/_2 - 9/_2 \\ 5/_2 - 7/_2 \end{array} $
3255,890 3252,437 3247,213 3243,724 3237,819	8 5 9 8 8	0,98 3,90 3,88 4,15 3,89	4,79 7,71 7,70 7,97 7,71	$a \ ^{4}D - z \ ^{6}D^{\circ}$ $b \ ^{4}D - z \ ^{2}D^{\circ}$ $b \ ^{4}D - y \ ^{4}F^{\circ}$ $c \ ^{2}G - z \ ^{2}F^{\circ}$ $b \ ^{4}D - y \ ^{4}F^{\circ}$	7/2 - 7/2 $5/2 - 3/2$ $3/2 - 5/2$ $9/2 - 7/2$ $1/2 - 3/2$
3237,402 3232,791 3231,702 3227,747 3213,314	5 7 5 13 13	3,88 4,16 3,88 1,67 1,70	7,71 7,98 7,72 5,51 5,55	$b {}^{4}D - y {}^{4}F^{\circ}$ $c {}^{2}G - z {}^{2}F^{\circ}$ $b {}^{4}D - z {}^{2}G^{\circ}$ $a {}^{4}P - z {}^{4}D^{\circ}$ $a {}^{4}P - z {}^{4}D^{\circ}$	3/2 - 3/2 $7/2 - 5/2$ $5/2 - 7/2$ $5/2 - 7/2$ $3/2 - 5/2$
3210,451 3196,076 3193,809 3192,926 3187,293	10 10 11 9 8	1,73 1,67 1,73 1,67 4,15	5,58 5,54 5,60 5,55 8,03	$a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{4}P-z\ ^{4}F^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ c\ ^{2}G-y\ ^{2}G^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}$	1/2 - 3/2 $5/2 - 7/2$ $1/2 - 1/2$ $5/2 - 5/2$ $9/2 - 9/2$
3186,741 3185,315 3183,108 3180,164 3179,504	11 5 8 7 8	1,70 1,72 1,70 4,74 4,73	5,58 5,61 5,59 8,63 8,62	$a^{4}P = z^{4}D$ $a^{4}P = z^{4}F^{\circ}$ $a^{4}P = z^{4}F^{\circ}$ $c^{2}D = y^{2}F^{\circ}$ $c^{2}D = y^{2}F^{\circ}$ $b^{4}D = x^{4}D^{\circ}$	3/2 - 3/2 $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $5/2 - 7/2$
3177,535 3170,346 3167,859 3163,091 3162,800	10 6 11 5 8	3,91 1,70 3,82 1,67 4,16	7,80 5,60 7,72 5,59 8,07	$a\ ^4P - z\ ^4D^\circ \ b\ ^2G - z\ ^2G^\circ \ a\ ^4P - z\ ^4F^\circ \ c\ ^2G - y\ ^2G^\circ \ a\ ^4P - z\ ^4F^\circ$	$ \begin{array}{c} $
3161,949 3154,206 3144,758 3135,364 3116,590	5 12 5 9 6	1,70 3,77 3,91 3,89 3,89	5,61 7,69 7,84 7,86 7,86	$a P - z P$ $b ^{2}G - z ^{2}G^{\circ}$ $b ^{4}D - x ^{4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3114,293 3105,548 3105,168 3096,296 3078,698	7 5 5 5 8	3,89 3,89 3,89 3,96 5,82	7,86 7,88 7,88 7,96 9,85	$b {}^{4}D - x {}^{4}D^{\circ}$ $b {}^{4}D - x {}^{4}D^{\circ}$ $b {}^{2}F - z {}^{2}F^{\circ}$ $z {}^{4}P^{\circ} - e {}^{4}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
3077 ,168 3076 ,455 3065 ,315 3062 ,233 3056 ,802	10 6 6 9 5	4,08 5,87 3,95 4,08 4,08	8,10 9,90 7,98 8,13 8,13	$a\ ^{2}I-z\ ^{2}H^{\circ}\ z\ ^{4}P^{\circ}-e\ ^{4}D\ b\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{2}I-z\ ^{2}II^{\circ}\ a\ ^{2}I-x\ ^{4}G^{\circ}$	$ \begin{array}{c} 13/_{2} - 11/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 5/_{2} \\ 11/_{2} - 9/_{2} \\ 13/_{2} - 11/_{2} \end{array} $
3049,011 3044,843 3036,986 3020,001 3002,649	5 5 5 10 13	5,87 3,96 5,82 4,08 1,70	9,94 8,03 9,89 8,18 5,82	$z^{4}P^{\circ}-e^{4}D$ $b^{2}F-y^{2}G^{\circ}$ $z^{4}P^{\circ}-e^{4}D$ $a^{2}I-x^{4}F^{\circ}$ $a^{4}P-z^{4}P^{\circ}$	3/2 $3/2$ $7/2$ $9/2$ $5/2$ $5/2$ $11/2$ $9/2$ $3/2$ $5/2$
3002,330 3000,059 2997,301	5 5 7	3,95 3,81 4,49	8,07 7,94 8,61	b ² F-y ² G° b ² G-y ⁴ G° b ² D-y ² F°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2985,550 2984,830	13 15	1,73 1,67	5,87 5,82	a ⁴ P-z ⁴ P° a ⁴ P-z ⁴ P°	$^{1/}_{2}$ $^{-3/}_{2}$ $^{5/}_{2}$ $^{-5/}_{2}$
2982,062 2979,352 2975,938 2970,682 2970,513	8 8 5 5 5	4,48 1,09 1,09 3,76 1,07	8,63 5,25 5,26 7,94 5,25	$b\ ^{2}D-y\ ^{2}F^{\circ}\ a\ ^{4}D-z\ ^{6}F^{\circ}\ a\ ^{4}D-z\ ^{6}F^{\circ}\ b\ ^{2}G-y\ ^{4}G^{\circ}\ a\ ^{4}D-z\ ^{6}F^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 9/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
2969,934 2965,037 2964,629 2964,131 2961,272	8 10 9 7 5	3,81 1,70 1,72 3,38 1,07	7,98 5,87 5,90 7,57 5,26	$b^{2}G-z^{2}F^{\circ}$ $a^{4}P-z^{4}P^{\circ}$ $a^{4}P-z^{4}P^{\circ}$ $a^{2}F-z^{4}G^{\circ}$ $a^{4}D-z^{6}F^{\circ}$	7/2 - 5/2 $ 3/2 - 3/2 $ $ 1/2 - 1/2 $ $ 7/2 - 5/2 $ $ 3/2 - 1/2$
2959,599 2953,778 2949,178 2947,658 2944,398	7 11 10 13 13	3,38 1,04 3,76 1,67 1,70	7,57 5,22 7,97 5,87 5,90	$a^{2}F - z^{2}D^{\circ}$ $a^{4}D - z^{6}F^{\circ}$ $b^{2}G - z^{2}F^{\circ}$ $a^{4}P - z^{4}P^{\circ}$ $a^{4}P - z^{4}P^{\circ}$	7/2 - 5/2 $5/2 - 7/2$ $9/2 - 7/2$ $5/2 - 3/2$ $3/2 - 1/2$
2939,506 2926,587 2922,024 2902,456 2897,262	5 12 5 5 8	1,04 0,98 3,91 3,76 3,42	5,25 5,22 8,14 8,03 7,70	$a \ ^4D - z \ ^6F^{\circ}$ $a \ ^4D - z \ ^6F^{\circ}$ $b \ ^4D - x \ ^4G^{\circ}$ $b \ ^2G - y \ ^2G^{\circ}$ $a \ ^2F - z \ ^2D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 9/2 \\ 9/2 - 9/2 \\ 5/2 - 3/2 \end{array} $
2895,215 2894,778 2888,093 2885,928 2883,702	7 7 5 5 10	3,91 3,26 3,19 4,07 3,24	8,18 7,55 7,49 8,37 7,54	$b^{4}D - x^{4}F^{\circ}$ $b^{2}H - z^{4}H^{\circ}$ $b^{2}P - y^{4}P^{\circ}$ $a^{2}I - y^{2}H^{\circ}$ $b^{2}H - z^{4}H^{\circ}$	7/2 - 9/2 $9/2 - 11/2$ $3/2 - 5/2$ $13/2 - 11/2$ $11/2 - 13/2$
2880,756 2876,802 2875,346 2873,401 2872,382	9 7 8 10 9	0,98 3,38 3,38 3,81 3,26	5,29 7,69 7,69 8,13 7,58	$a\ ^{4}D-z\ ^{6}P^{\circ}$ $a\ ^{2}F-y\ ^{4}F^{\circ}$ $a\ ^{2}F-z\ ^{2}G^{\circ}$ $b\ ^{2}G-z\ ^{2}H^{\circ}$ $b\ ^{2}H-z\ ^{4}H^{\circ}$	7/2 - 7/2 $7/2 - 7/2$ $7/2 - 9/2$ $7/2 - 9/2$ $9/2 - 7/2$
2871,125 2871,059 2868,874 2864,973 2858,343	6 6 5 5 11	3,24 3,20 1,04 3,90 3,22	7,56 7,51 5,36 8,23 7,56	$b^{2}H - z^{4}H^{\circ}$ $a^{4}G - z^{4}G^{\circ}$ $a^{4}D - z^{6}P^{\circ}$ $b^{4}D - x^{4}F^{\circ}$ $a^{4}G - z^{4}G^{\circ}$	$^{11}/_{2}$ _ $^{9}/_{2}$ $^{9}/_{2}$ _ $^{11}/_{2}$ $^{5}/_{2}$ _ $^{5}/_{2}$ $^{7}/_{2}$ _ $^{7}/_{2}$
2857 ,171 2856 ,928 2856 ,392 2856 ,141 2855 ,670	7 8 5 7 9	3,88 5,51 5,36 3,20 3,22	8,23 9,85 9,70 7,54 7,56	$b^{4}D - x^{4}F^{\circ}$ $z^{4}D^{\circ} - e^{4}D$ $z^{6}P^{\circ} - e^{6}D$ $a^{4}G - z^{4}G^{\circ}$ $a^{4}G - z^{4}H^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \\ 9/2 - 9/2 \\ 7/2 - 9/2 \end{array} $
2849,606 2848,899 2848,332 2848,122 2848,046	7 5 7 7 8	3,20 4,08 5,59 5,55 3,23	7,54 8,42 9,94 9,90 7,58	$a\ ^{4}G-z\ ^{4}II^{\circ}$ $a\ ^{2}I-y\ ^{2}II^{\circ}$ $z\ ^{4}F^{\circ}-e\ ^{4}D$ $z\ ^{4}D^{\circ}-e\ ^{4}D$ $a\ ^{4}G-z\ ^{4}II^{\circ}$	9/2 - 11/2 $11/2 - 9/2$ $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 7/2$
2843,485 2840,756 2840,647 2840,342 2839,819	5 8 9 7 6	3,88 3,77 3,33 3,45 5,29	8,24 8,13 7,69 7,51 9,65	$b {}^{4}D - x {}^{4}F^{\circ}$ $b {}^{2}G - x {}^{4}G^{\circ}$ $b {}^{2}P - z {}^{2}D^{\circ}$ $a {}^{4}G - z {}^{4}G^{\circ}$ $z {}^{6}P^{\circ} - c {}^{6}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 9/2 - 11/2 \\ 1/2 - 3/2 \\ 11/2 - 11/2 \\ 7/2 - 9/2 \end{array} $
2839,535 2837,300 2835,716 2833,100 2831,562	7 5 9 5 11	5,48 3,26 3,19 5,36 3,19	9,85 7,63 7,57 9,73 7,57	$z^{4}F^{\circ}-c^{4}D$ $b^{2}H-z^{4}I^{\circ}$ $b^{2}P-z^{4}G^{\circ}$ $z^{6}P^{\circ}-e^{6}j)$ $b^{2}P-z^{2}D^{\circ}$	9/2 - 7/2 $9/2 - 11/2$ $3/2 - 5/2$ $5/2 - 5/2$ $3/2 - 5/2$
/CQ					

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2828,634 2827,431 2813,613 2809,806 2805,791	6 5 5 7 5	3,24 3,24 3,22 5,29 3,38	7,62 7,63 7,62 9,70 7,80	$b^{2}H-z^{4}I^{\circ} \\ b^{2}H-z^{4}I^{\circ} \\ a^{4}G-z^{4}I^{\circ} \\ z^{6}P^{\circ}-e^{6}D \\ a^{2}F-x^{4}D^{\circ}$	$ \begin{array}{c} 11/_{2} - 9/_{2} \\ 11/_{z} - 13/_{2} \\ 7/_{2} - 9/_{2} \\ 7/_{2} - 7/_{2} \\ 7/_{2} - 7/_{2} \end{array} $
2799,286 2797,914 2793,888 2785,213 2783,696	7 5 7 8 12	3,26 3,26 3,20 5,20 3,24	7,69 7,70 7,63 9,65 7,70	$b^{2}H-y^{4}F^{\circ} \\ b^{2}H-z^{2}G^{\circ} \\ a^{4}G-z^{4}F^{\circ} \\ z^{6}F^{\circ}-e^{6}D \\ b^{2}H-z^{2}G^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ 9/2 - 9/2 \\ 9/2 - 11/2 \\ 11/2 - 9/2 \\ 11/2 - 9/2 \end{array} $
2779,299 2777,892 2776,923 2774,691 2771,184	11 5 5 7 5	3,26 3,24 5,22 3,33 3,76	7,72 7,70 9,69 7,80 8,23	$b^{2}H-z^{2}G^{\circ} \ b^{2}H-y^{4}F^{\circ} \ z^{6}F^{\circ}-e^{6}D \ b^{2}P-y^{4}D^{\circ} \ b^{2}G-y^{4}H^{\circ}$	9/2 - 7/2 $11/2 - 9/2$ $7/2 - 7/2$ $1/2 - 3/2$ $9/2 - 11/2$
2770,508 2769,354 2769,153 2768,934 2767,503	5 9 6 8 13	3,15 3,15 3,22 4,07 3,24	7,62 7,63 7,69 5,55 7,72	$a\ {}^{4}G-z\ {}^{4}I^{\circ}\ a\ {}^{4}G-z\ {}^{4}I^{\circ}\ a\ {}^{4}G-z\ {}^{2}G^{\circ}\ a\ {}^{4}D-z\ {}^{4}D^{\circ}\ b\ {}^{2}H-z\ {}^{2}I^{\circ}$	$ \begin{array}{c} 11/_2 - 9/_2 \\ 11/_2 - 13/_2 \\ 7/_2 - 9/_2 \\ 3/_2 - 5/_2 \\ 11/_2 - 13/_2 \end{array} $
2761,813 2757,025 2756,512 2755,737 2754,907	9 5 5 15 6	1,09 3,20 3,23 0,98 5,23	5,58 7,69 7,72 5,48 9,73	$a\ ^{4}D-z\ ^{4}D^{\circ}\ a\ ^{4}G-y\ ^{4}F^{\circ}\ a\ ^{4}G-z\ ^{2}G^{\circ}\ a\ ^{4}D-z\ ^{4}F^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}D$	$1/_2$ $3/_2$ $9/_2$ $7/_2$ $5/_2$ $7/_2$ $7/_2$ $9/_2$ $7/_2$ $5/_2$
2753,287 2751,123 2749,484 2749,324 2749,184	12 6 12 14 13	3,26 3,19 1,09 1,04 1,07	7,77 7,70 5,60 5,55 5,58	$b^{2}H-z^{2}I^{\circ} \\ b^{2}P-z^{2}D^{\circ} \\ a^{4}D-z^{4}D^{\circ} \\ a^{4}D-z^{6}F^{\circ} \\ a^{4}D-z^{4}D^{\circ}$	9/2 - 11/2 $3/2 - 3/2$ $1/2 - 1/2$ $5/2 - 7/2$ $3/2 - 3/2$
2746,483 2743,196 2741,397 2739,546 2736,968	14 14 6 15 12	1,07 1,09 3,42 0,98 1,07	5,59 5,61 7,94 5,51 5,60	$a\ ^{4}D-z\ ^{4}F^{\circ}\ a\ ^{4}D-z\ ^{4}F^{\circ}\ a\ ^{2}F-y\ ^{4}G^{\circ}\ a\ ^{4}D-z\ ^{4}D^{\circ}\ a\ ^{4}D-z\ ^{4}D^{\circ}$	3/2 - 5/2 $1/2 - 3/2$ $5/2 - 5/2$ $7/2 - 7/2$ $3/2 - 1/2$
2730,738 2727,539 2727,382 2724,885 2722,737	11 13 8 9 5	1,07 1,04 3,15 1,04 6,22	5,61 5,58 7,69 5,59 10,77	$a\ ^{4}D-z\ ^{4}F^{\circ}\ a\ ^{4}D-z\ ^{4}D^{\circ}\ a\ ^{4}G-z\ ^{2}G^{\circ}\ a\ ^{4}D-z\ ^{4}F^{\circ}\ c\ ^{4}P-v\ ^{4}D^{\circ}$	3/2 - 3/2 $5/2 - 3/2$ $11/2 - 9/2$ $5/2 - 5/2$ $5/2 - 7/2$
2722,040 2719,296 2718,639 2716,218 2714,412	5 5 5 9 13	3,39 4,50 6,22 3,42 0,99	7,94 9,05 10,77 7,99 5,55	$a\ ^{2}F-y\ ^{4}G^{\circ}\ b\ ^{2}D-x\ ^{2}F^{\circ}\ c\ ^{4}F-v\ ^{4}D^{\circ}\ a\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{4}D-z\ ^{4}D^{\circ}$	7/2 $5/2$ $7/2$ $5/2$ $7/2$ $9/2$ $7/2$ $5/2$ $5/2$ $7/2$ $5/2$
2712,388 2711,845 2709,056 2707,132 2706,566	6 9 7 6 7	3,20 3,15 3,19 4,48 4,50	7,77 7,72 7,77 9,06 9,07	$a\ ^{4}G-z\ ^{4}I^{\circ}\ a\ ^{4}G-z\ ^{2}I^{\circ}\ b\ ^{2}P-y\ ^{4}D^{\circ}\ b\ ^{2}D-x\ ^{2}F^{\circ}\ b\ ^{2}D-y\ ^{2}P^{\circ}$	$\begin{array}{c} 9/2 - 11/2 \\ 11/2 - 13/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \end{array}$
2703,989 2697,462 2692,836 2692,597 2684,751	10 5 5 10 10	3,39 4,48 0,99 3,77 3,82	7,97 9,07 5,58 8,36 8,42	$a\ ^{2}F-z\ ^{2}F^{\circ}\ b\ ^{2}D-y\ ^{2}P^{\circ}\ a\ ^{4}D-z\ ^{4}F^{\circ}\ b\ ^{2}G-y\ ^{2}H^{\circ}\ b\ ^{2}G-y\ ^{2}H^{\circ}$	7/2 - 7/2 $3/2 - 1/2$ $7/2 - 5/2$ $9/2 - 11/2$ $7/2 - 9/2$
2666,635 2664,664 2658,251	10 10 5	3,42 3,38 3,97	8,07 8,03 8,63	$a\ ^{2}F-y\ ^{2}G^{\circ}\ a\ ^{2}F-y\ ^{2}G^{\circ}\ b\ ^{2}F-y\ ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \end{array} $

I	E _H , eV	E _B , eV	Transition	J
4	5,82 6,79	10,49 11,47	z ⁴ P°—f ⁴ D d ² F—u ² G°	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{5}{2}$ $\frac{-7}{2}$
5 6 5 8 13	3,33 3,33 4,73 2,80 0,08	8,03 8,04 9,44 7,51 4,79	$b^{\ 2}P - z^{\ 2}P^{\circ} \ b^{\ 2}P - z^{\ 2}P^{\circ} \ c^{\ 2}D - x^{\ 2}P^{\circ} \ b^{\ 4}F - z^{\ 4}G^{\circ} \ a^{\ 6}D - z^{\ 6}D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 9/2 - 11/2 \\ 5/2 - 7/2 \end{array} $
13 8 8 13 6	0,11 2,85 2,84 0,12 2,85	4,82 7,57 7,56 4,84 7,57	$a \ ^{6}D - z \ ^{6}D^{\circ}$ $b \ ^{4}F - z \ ^{4}G^{\circ}$ $b \ ^{4}F - z \ ^{6}D^{\circ}$ $a \ ^{6}D - z \ ^{6}D^{\circ}$ $b \ ^{4}F - z \ ^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
13 9 5 10 7	0,05 4,08 2,84 0,12 2,83	4,77 8,80 7,57 4,85 7,56	$a\ ^{6}D-z\ ^{6}D^{\circ}\ a\ ^{2}I-z\ ^{2}K^{\circ}\ b\ ^{4}F-z\ ^{4}G^{\circ}\ a\ ^{6}D-z\ ^{6}D^{\circ}\ b\ ^{4}F-z\ ^{4}G^{\circ}$	7/2 - 9/2 $11/2 - 13/2$ $5/2 - 5/2$ $1/2 - 1/2$ $7/2 - 7/2$
6 7 12 13 13	0,11 2,80 0,08 0,11 0,05	4,84 7,54 4,82 4,85 4,79	$a \ ^{6}D-z \ ^{6}D^{\circ} \ b \ ^{4}F-z \ ^{4}G^{\circ} \ a \ ^{6}D-z \ ^{6}D^{\circ} \ a \ ^{6}D-z \ ^{6}D^{\circ} \ a \ ^{6}D-z \ ^{6}D^{\circ} \ a \ ^{6}D-z \ ^{6}D^{\circ}$	3/2— $3/2$ $9/2$ — $9/2$ $5/2$ — $5/2$ $3/2$ — $1/2$ $7/2$ — $7/2$
6 5 13 7 6	1,08 3,97 0,08 4,50 3,23	5,82 8,71 4,81 9,25 7,98	$a\ ^4D-z\ ^4P^\circ \ b\ ^2F-x\ ^2G^\circ \ a\ ^6D-z\ ^6D^\circ \ b\ ^2D-x\ ^2D^\circ \ a\ ^4G-z\ ^2F^\circ$	3/2 - 5/2 $7/2 - 9/2$ $5/2 - 5/2$ $5/2 - 5/2$ $5/2 - 5/2$
6 6 14 14 7	4,48 5,57 0,00 0,05 1,10	9,24 10,32 4,77 4,82 5,87	$\begin{array}{c} b \ ^{2}D - x \ ^{2}D^{\circ} \\ c \ ^{2}F - v \ ^{2}G^{\circ} \\ a \ ^{6}D - z \ ^{6}D^{\circ} \\ a \ ^{6}D - z \ ^{6}D^{\circ} \\ a \ ^{4}D - z \ ^{4}P^{\circ} \end{array}$	3/2 - 3/2 $5/2 - 7/2$ $9/2 - 9/2$ $7/2 - 5/2$ $1/2 - 3/2$
9 10 7 13 10	4,08 1,04 4,16 0,00 1,08	8,85 5,82 8,94 4,79 5,87	$a\ ^{2}I-z\ ^{2}K^{\circ}\ a\ ^{4}D-z\ ^{4}P^{\circ}\ c\ ^{2}G-x\ ^{2}H^{\circ}\ a\ ^{6}D-z\ ^{6}D^{\circ}\ a\ ^{4}D-z\ ^{4}P^{\circ}$	$ \begin{array}{c} 13/2 - 15/2 \\ 5/2 - 5/2 \\ 7/2 - 9/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
9 7 9 7 5	1,09 4,15 2,58 3,81 5,95	5,90 8,96 7,40 8,63 10,77	$a\ ^{4}D-z\ ^{4}P^{\circ}\ c\ ^{2}G-x\ ^{2}H^{\circ}\ b\ ^{4}P-z\ ^{4}S^{\circ}\ b\ ^{2}G-y\ ^{2}F^{\circ}\ d\ ^{2}D-v\ ^{4}D^{\circ}$	1/2 - 1/2 $9/2 - 11/2$ $5/2 - 3/2$ $7/2 - 5/2$ $5/2 - 7/2$
6 9 5 12 13	2,78 1,07 5,56 1,05 0,99	7,60 5,90 10,39 5,87 5,82	$b^{4}P - y^{4}P^{\circ}$ $a^{4}D - z^{4}P^{\circ}$ $c^{2}F - v^{2}G^{\circ}$ $a^{4}D - z^{4}P^{\circ}$ $a^{4}D - z^{4}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
7 5 5 7 5	3,20 3,42 3,23 2,85 2,84	8,04 8,26 8,07 7,70 7,69	$b^{\ 2}P - z^{\ 2}P^{\circ} \ a^{\ 2}F - y^{\ 4}H^{\circ} \ a^{\ 4}G - y^{\ 2}G^{\circ} \ b^{\ 4}F - y^{\ 4}F^{\circ} \ b^{\ 4}F - y^{\ 4}F^{\circ}$	3/2 - 3/2 $5/2 - 7/2$ $5/2 - 7/2$ $3/2 - 5/2$ $5/2 - 7/2$
8 8 8 8 7	3,25 3,27 2,84 2,85 3,76	8,11 8,13 7,70 7,71 8,62	$b^{2}H-z^{2}H^{\circ} \\ b^{2}H-z^{2}H^{\circ} \\ b^{4}F-y^{4}F^{\circ} \\ b^{4}F-y^{4}F^{\circ} \\ b^{2}G-y^{2}F^{\circ}$	$^{11}/_{2}$ _ $^{11}/_{2}$ $^{9}/_{2}$ _ $^{9}/_{2}$ $^{5}/_{2}$ _ $^{5}/_{2}$ $^{3}/_{2}$ _ $^{3}/_{2}$
	44 5 6 5 8 13 13 8 8 13 6 13 9 5 10 7 6 7 12 13 13 6 5 13 7 6 6 6 6 14 14 7 9 10 7 13 10 9 7 9 7 5 6 9 5 12 13 7 5 5 7 5 8 8 8 8 8 8	4 5,82 4 6,79 5 3,33 6 3,33 5 4,73 8 2,80 13 0,08 13 0,11 8 2,85 8 2,84 13 0,12 6 2,85 13 0,05 9 4,08 5 2,84 10 0,12 7 2,83 6 0,11 7 2,80 12 0,08 13 0,11 13 0,05 6 1,08 5 3,97 13 0,05 6 3,23 6 4,48 6 5,57 14 0,00 14 0,05 7 1,10 9 4,08 10 1,04 10 1,04 11 0,05 12 1,05 13 0,05 14 0,00 15 1,00 16 1,08 17 1,00 18 1,04 19 1,09 19 1,09 10 1,08 10 1,09 10 1,08 10 1,08 10 1,09 10 1,08 10 1,09 11 1,09 12 1,05 13 0,99 13 2,85 14 1,05 15 1,05 16 2,78 17 2,88 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,23 18 3,25 18 3,25 18 3,23 18 3,25 18 3,27 18 2,84 18 2,85	4 5,82 10,49 4 6,79 11,47 5 3,33 8,03 6 3,33 8,04 5 4,73 9,44 8 2,80 7,51 13 0,08 4,79 13 0,11 4,82 8 2,85 7,57 8 2,84 7,56 13 0,12 4,84 6 2,85 7,57 13 0,05 4,77 9 4,08 8,80 5 2,84 7,57 10 0,12 4,85 7 2,83 7,56 6 0,11 4,84 7 2,80 7,54 12 0,08 4,82 13 0,11 4,85 13 0,05 4,79 6 1,08 5,82 13 0,11 4,85 13 0,05 4,79 6 1,08 4,81 7 2,80 7,54 12 0,08 4,82 13 0,11 4,85 13 0,05 4,79 6 1,08 5,82 5 3,97 8,71 13 0,08 4,81 7 4,50 9,25 6 3,23 7,98 6 4,48 9,24 6 5,57 10,32 14 0,00 4,77 14 0,05 4,82 7 1,10 5,87 9 4,08 8,85 10 1,04 5,82 7 4,16 8,94 13 0,00 4,77 14 0,05 4,82 7 1,10 5,87 9 4,08 8,85 10 1,04 5,82 7 4,16 8,94 13 0,00 4,79 10 1,08 5,87 9 1,09 5,90 7 4,15 8,96 9 2,58 7,40 7 3,81 8,63 5 5,95 10,77 6 2,78 7,60 9 1,07 5,90 5 5,56 10,39 12 1,05 5,87 13 0,99 5,82 7 3,20 8,04 5 3,42 8,26 5 3,23 8,07 7 2,85 7,70 5 2,84 7,69 8 3,25 8,11 8 3,27 8,13 8 2,84 7,70 8 2,85 7,71	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2548,925 2548,741 2548,590 2547,330 2546,667	5 7 6 5 8	4,08 2,70 2,67 2,69 2,83	8,94 7,56 7,54 7,56 7,69	$a^{2}I - x^{2}H^{\circ}$ $b^{4}P - y^{4}P^{\circ}$ $a^{4}H - z^{4}G^{\circ}$ $a^{4}H - z^{4}G^{\circ}$ $b^{4}F - y^{4}F^{\circ}$	$ \begin{array}{c} 11/_2 - 9/_2 \\ 3/_2 - 1/_2 \\ 9/_2 - 9/_2 \\ 7/_2 - 7/_2 \\ 7/_2 - 7/_2 \end{array} $
2545,215 2544,972 2543,431 2543,384 2542,733	7 6 5 9 5	2,69 2,70 2,84 2,67 3,33	7,56 7,57 7,71 7,54 8,21	$a\ ^{4}H-z\ ^{4}H^{\circ}\ b\ ^{4}P-z\ ^{2}D^{\circ}\ b\ ^{4}F-y\ ^{4}F^{\circ}\ a\ ^{4}H-z\ ^{4}H^{\circ}\ b\ ^{2}P-z\ ^{2}S^{\circ}$	7/2 - 9/2 $3/2 - 5/2$ $5/2 - 3/2$ $9/2 - 11/2$ $1/2 - 1/2$
2541,831 2541,096 2540,666 2539,003 2538,997	7 7 6 10 8	2,69 2,83 2,83 2,63 2,67	7,57 7,70 7,70 7,51 7,56	$a\ ^{4}II - z\ ^{4}G^{\circ}$ $b\ ^{4}F - y\ ^{4}F^{\circ}$ $b\ ^{4}F - y\ ^{4}F^{\circ}$ $a\ ^{4}H - z\ ^{4}G^{\circ}$ $a\ ^{4}H - z\ ^{4}G^{\circ}$	7/2 - 5/2 $7/2 - 5/2$ $7/2 - 9/2$ $13/2 - 11/2$ $9/2 - 7/2$
2538,809 2538,500 2538,205 2537,142 2536,817	9 5 6 5 9	2,66 2,69 4,07 4,77 2,67	7,54 7,57 8,95 9,64 7,56	$a \ ^{4}H - z \ ^{4}G^{\circ}$ $a \ ^{4}H - z \ ^{2}D^{\circ}$ $a \ ^{2}I - x \ ^{2}H^{\circ}$ $z \ ^{6}D^{\circ} - e \ ^{6}D$ $a \ ^{4}H - z \ ^{4}H^{\circ}$	$ \begin{array}{c} 11/_{2} - 9/_{2} \\ 7/_{2} - 5/_{2} \\ 13/_{2} - 11/_{2} \\ 9/_{2} - 9/_{2} \\ 9/_{2} - 9/_{2} \end{array} $
2536,673 2535,480 2534,416 2533,627 2530,103	7 7 9 10 6	3,24 2,80 2,69 2,66 2,83	8,13 7,69 7,58 7,55 7,72	$b^{2}H - x^{4}G^{\circ}$ $b^{4}F - y^{4}F^{\circ}$ $a^{4}H - z^{4}H^{\circ}$ $a^{4}H - z^{4}H^{\circ}$ $b^{4}F - z^{2}G^{\circ}$	$ \begin{array}{c} 11/_{2} - 11/_{2} \\ 9/_{2} - 7/_{2} \\ 7/_{2} - 7/_{2} \\ 11/_{2} - 11/_{2} \\ 7/_{2} - 7/_{2} \end{array} $
2529,547 2529,545 2529,221 2529,080 2527,102	10 10 5 5 6	2,70 2,80 3,24 4,74 2,66	7,60 7,70 8,14 9,64 7,56	$b\ ^4P - y\ ^4P^\circ \ b\ ^4F - y\ ^4F^\circ \ b\ ^2H - x\ ^4G^\circ \ c\ ^2D - v\ ^2F^\circ \ a\ ^4H - z\ ^4H^\circ$	$ \begin{array}{c} 3/2 - 3/2 \\ 9/2 - 9/2 \\ 11/2 - 9/2 \\ 3/2 - 5/2 \\ 11/2 - 9/2 \end{array} $
2526,295 2526,071 2525,387 2521,814 2521,089	9 5 10 7 7	2,58 2,67 2,63 4,16 3,42	7,49 7,58 7,54 9,07 8,33	$b\ ^4P - y\ ^4P^\circ \ a\ ^4H - z\ ^4H^\circ \ a\ ^4H - z\ ^4H^\circ \ c\ ^2G - w\ ^2G^\circ \ a\ ^2F - y\ ^2D^\circ$	$ \begin{array}{c} 5/2 - 5/2 \\ 9/2 - 7/2 \\ 13/2 - 13/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
2519,044 2517,120 2514,383 2512,513 2511,759	7 6 7 5 10	3,38 2,78 3,81 4,48 2,69	8,30 7,70 8,74 9,41 7,62	$a\ ^{2}F-y\ ^{2}D^{\circ}\ b\ ^{4}P-z\ ^{2}D^{\circ}\ b\ ^{2}G-x\ ^{2}G^{\circ}\ b\ ^{2}D-w\ ^{2}F^{\circ}\ a\ ^{4}II-z\ ^{4}I^{\circ}$	7/2 - 5/2 $1/2 - 3/2$ $7/2 - 7/2$ $3/2 - 5/2$ $7/2 - 9/2$
2509,122 2506,093 2503,870 2503,560 2503,325	5 7 7 5 7	3,24 3,20 3,77 2,85 3,15	8,18 8,14 8,72 7,80 8,10	$b\ ^{2}H-x\ ^{4}F^{\circ}\ a\ ^{4}G-x\ ^{4}G^{\circ}\ b\ ^{2}G-x\ ^{2}G^{\circ}\ b\ ^{4}F-y\ ^{4}D^{\circ}\ a\ ^{4}G-z\ ^{2}H^{\circ}$	$ \begin{array}{c} 11/2 - 9/2 \\ 9/2 - 9/2 \\ 9/2 - 9/2 \\ 3/2 - 3/2 \\ 11/2 - 11/2 \end{array} $
2502,390 2500,919 2498,894 2497,820 2493,261	7 5 10 7 12	3,22 4,73 2,67 2,84 2,63	8,17 9,68 7,63 7,80 7,60	$a\ {}^{4}G - x\ {}^{4}G^{\circ}$ $c\ {}^{2}D - v\ {}^{2}F^{\circ}$ $a\ {}^{4}H - z\ {}^{4}I^{\circ}$ $b\ {}^{4}F - y\ {}^{4}D^{\circ}$ $a\ {}^{4}H - z\ {}^{4}I^{\circ}$	7/2 - 7/2 $5/2 - 7/2$ $9/2 - 11/2$ $5/2 - 3/2$ $13/2 - 15/2$
2493,180 2491,392 2490,856 2489,822 2487,356	12 6 6 8 5	2,66 3,20 2,83 3,15 5,41	7,63 8,17 7,80 8,13 10,39	$a\ ^{4}H-z\ ^{4}I^{\circ}\ a\ ^{4}G-x\ ^{4}G^{\circ}\ b\ ^{4}F-x\ ^{4}D^{\circ}\ a\ ^{4}G-x\ ^{4}G^{\circ}\ z\ ^{6}P^{\circ}-32$	$\begin{array}{c} 11/2 - 13/2 \\ 9/2 - 7/2 \\ 7/2 - 7/2 \\ 11/2 - 11/2 \\ 3/2 - 5/2 \end{array}$
2486 ,345 2484 ,243 2482 ,654	7 5 8	3,20 3,24 3,15	8,18 8,23 8,14	$a\ {}^{4}G-x\ {}^{4}F^{\circ}\ b\ {}^{2}H-y\ {}^{4}H^{\circ}\ a\ {}^{4}G-x\ {}^{4}G^{\circ}$	$\begin{array}{c} 9/2 - 9/2 \\ 11/2 - 13/2 \\ 11/2 - 9/2 \end{array}$

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λ, Å	I	$E_{_{ m H}},~{ m eV}$	E _B , eV	Transition	J
2482 ,115 2480 ,158	8	2,63 2,80	7,63 7,80	$a {}^{4}H - z {}^{4}I^{\circ}$ $b {}^{4}F - x {}^{4}D^{\circ}$	$^{13}/_{2}$ _ $^{13}/_{2}$ _ $^{9}/_{2}$ _ $^{7}/_{2}$
2478,568 2474,765 2473,314 2472,426 2470,658	6 6 6 5 7	2,84 3,22 2,78 2,85 2,83	7,84 8,23 7,79 7,86 7,84	$b\ ^4F-x\ ^4D^\circ\ a\ ^4G-x\ ^4F^\circ\ b\ ^4P-y\ ^4D^\circ\ b\ ^4F-x\ ^4D^\circ\ b\ ^4F-x\ ^4D^\circ$	$\begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array}$
2469,712 2467,732 2466,811 2466,670 2465,200	8 6 7 7 7	5,29 5,41 2,84 2,85 2,77	10,30 10,43 7,86 7,88 7,80	$z^{6}P^{\circ}-e^{6}F$ $z^{6}P^{\circ}-34$ $b^{4}F-x^{4}D^{\circ}$ $b^{4}F-x^{4}D^{\circ}$ $b^{4}P-y^{4}D^{\circ}$	7/2 $3/2$ $3/2$ $3/2$ $1/2$ $5/2$ $3/2$ $1/2$ $3/2$ $1/2$ $1/2$ $3/2$
2464,907 2464,007 2463,900 2463,280 2461,857	7 7 5 6 8	3,23 3,21 5,36 3,15 3,23	8,25 8,23 10,39 8,18 8,25	$a\ {}^{4}G - x\ {}^{4}F^{\circ} \ a\ {}^{4}G - x\ {}^{4}F^{\circ} \ z\ {}^{6}P^{\circ} - 32 \ a\ {}^{4}G - x\ {}^{4}F^{\circ} \ a\ {}^{4}G - y\ {}^{4}H^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \\ 11/2 - 9/2 \\ 7/2 - 9/2 \end{array}$
2461 ,282 2460 ,453 2458 ,964 2458 ,782 2455 ,892	8 5 5 8 10	3,23 5,48 3,88 3,21 5,41	8,26 10,52 8,92 8,24 10,45	$a\ {}^{4}G - y\ {}^{4}H^{\circ}$ $z\ {}^{4}F^{\circ} - e\ {}^{4}G$ $b\ {}^{4}D - w\ {}^{4}P^{\circ}$ $a\ {}^{4}G - y\ {}^{4}H^{\circ}$ $z\ {}^{6}P^{\circ} - e\ {}^{6}P$	$ \begin{array}{c} 5/2 - 7/2 \\ 9/2 - 11/2 \\ 5/2 - 3/2 \\ 9/2 - 11/2 \\ 3/2 - 3/2 \end{array} $
2454,567 2453,935 2453,747 2450,134 2447,747	6 25 15 5 6	4,08 5,22 5,23 5,25 4,08	9,13 10,27 10,28 10,30 9,14	$a\ ^{2}I-w\ ^{2}H^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}F\ z\ ^{6}F^{\circ}-e\ ^{6}F\ z\ ^{6}F^{\circ}-e\ ^{6}F\ a\ ^{2}I-w\ ^{2}H^{\circ}$	$\begin{array}{c} 13/_2 - 11/_2 \\ 9/_2 - 11/_2 \\ 7/_2 - 9/_2 \\ 5/_2 - 7/_2 \\ 11/_2 - 9/_2 \end{array}$
2446,462 2446,405 2445,558 2445,114 2444,512	5 25 7 40 8	2,66 5,22 2,70 5,20 2,58	7,72 10,28 7,77 10,27 7,65	$a\ ^{4}H-z\ ^{2}I^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}F\ b\ ^{4}P-y\ ^{1}D^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}F\ b\ ^{4}P-y\ ^{4}D^{\circ}$	$\begin{array}{c} 11/_2 - 13/_2 \\ 9/_2 - 9/_2 \\ 3/_2 - 5/_2 \\ 11/_2 - 11/_2 \\ 5/_2 - 7/_2 \end{array}$
2444,274 2443,842 2439,860 2439,300 2437,632	10 15 8 8 20	5,23 5,25 5,25 3,15 5,20	10,30 10,32 10,32 8,23 10,28	$z\ ^{6}F^{\circ}-e\ ^{6}F\ z\ ^{6}F^{\circ}-e\ ^{6}F\ z\ ^{6}F^{\circ}-e\ ^{6}F\ a\ ^{4}G-y\ ^{4}H^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}F$	7/2 - 7/2 $3/2 - 5/2$ $5/2 - 5/2$ $11/2 - 13/2$ $11/2 - 9/2$
2437,100 2436,987 2436,615 2434,988 2434,944	5 10 20 25 7	5,26 5,22 5,36 5,29 2,85	10,34 10,30 10,44 10,37 7,94	$z {}^{6}F^{\circ} - e {}^{6}F$ $z {}^{6}F^{\circ} - e {}^{6}F$ $z {}^{6}P^{\circ} - e {}^{6}P$ $z {}^{6}P^{\circ} - 30$ $b {}^{4}F - y {}^{4}G^{\circ}$	$1/_2 - 3/_2$ $9/_2 - 7/_2$ $5/_2 - 5/_2$ $7/_2 - 7/_2$ $3/_2 - 5/_2$
2434,822 2434,733 2434,229 2434,052 2432,267	5 7 20 15 7	5,25 4,08 5,29 5,23 2,84	10,34 9,17 10,38 10,32 7,94	$z^{6}F^{\circ}-e^{6}F$ $a^{2}I-y^{2}I^{\circ}$ $z^{6}P^{\circ}-e^{6}P$ $z^{6}F^{\circ}-e^{6}F$ $b^{4}F-y^{4}G^{\circ}$	3/2 - 3/2 $11/2 - 11/2$ $7/2 - 7/2$ $7/2 - 5/2$ $5/2 - 7/2$
2430,876 2430,072 2429,148 2428,970 2428,367	10 7 10 6 6	5,25 2,83 5,29 5,25 3,90	10,34 7,93 10,39 10,36 9,01	$z^{6}F^{\circ}-e^{6}F$ $b^{4}F-y^{4}G^{\circ}$ $z^{6}P^{\circ}-32$ $z^{6}F^{\circ}-e^{6}F$ $b^{4}D-w^{4}F^{\circ}$	$ \begin{array}{c} 5/_2 - 3/_2 \\ 7/_2 - 9/_2 \\ 7/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 7/_2 - 9/_2 \end{array} $
2424,143 2417,866 2413,309 2411,066 2410,517	8 6 9 9	2,80 3,24 0,12 0,12 0,11	7,92 8,37 5,26 5,26 5,25	$b^{4}F - y^{4}G^{\circ}$ $b^{2}H - y^{2}H^{\circ}$ $a^{6}D - z^{6}F^{\circ}$ $a^{6}D - z^{6}F^{\circ}$ $a^{6}D - z^{6}F^{\circ}$	$ \begin{array}{c} 9/2 - 11/2 \\ 11/2 - 11/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
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λ. Å	I	E _H , eV	E _B , eV	Transition	J
2406,658 2404,882 2404,430 2402,450 2399,239	9 9 7 8 9	0,11 0,08 0,11 5,22 0,08	5,26 5,24 5,26 10,38 5,25	$a \ ^{6}D-z \ ^{6}F^{\circ} \ a \ ^{6}D-z \ ^{6}F^{\circ} \ a \ ^{6}D-z \ ^{6}F^{\circ} \ z \ ^{6}F^{\circ}-e \ ^{6}P \ a \ ^{6}D-z \ ^{6}F^{\circ}$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 1/2$ $9/2 - 7/2$ $5/2 - 5/2$
2399,237 2395,625 2395,408 2388,627 2384,386	9 9 7 9 7	0,38 0,05 0,05 0,05 0,05 0,38	5,55 5,22 5,26 5,24 5,58	$a\ ^{4}F-z\ ^{4}D^{\circ}\ a\ ^{6}D-z\ ^{6}F^{\circ}\ a\ ^{6}D-z\ ^{6}F^{\circ}\ a\ ^{6}D-z\ ^{6}F^{\circ}\ a\ ^{4}F-z\ ^{4}D^{\circ}$	3/2 - 5/2 $7/2 - 9/2$ $7/2 - 3/2$ $7/2 - 7/2$ $3/2 - 3/2$
2383 ,242 2382 ,039 2380 ,759 2379 ,275 2376 ,435	7 9 7 7 5	0,35 0,00 0,08 0,30 5,20	5,55 5,20 5,29 5,51 10,42	$a\ ^{4}F-z\ ^{4}D^{\circ}\ a\ ^{6}D-z\ ^{6}F^{\circ}\ a\ ^{6}D-z\ ^{6}P^{\circ}\ a\ ^{6}F-z\ ^{4}D^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}G$	$ \begin{array}{c} 5/2 - 5/2 \\ 9/2 - 11/2 \\ 5/2 - 7/2 \\ 7/2 - 7/2 \\ 11/2 - 13/2 \end{array} $
2375,192 2373,6250 2370,496 2369,960 2368,595	7 8 5 5 7	0,38 0,00 0,38 5,22 0,35	5,60 5,22 5,61 10,45 5,58	$a\ ^{4}F-z\ ^{4}D^{\circ}\ a\ ^{6}D-z\ ^{6}F^{\circ}\ a\ ^{4}F-z^{4}F^{\circ}\ z\ ^{6}F^{\circ}-e\ ^{6}G\ a\ ^{4}F-z\ ^{4}D^{\circ}$	3/2 - 1/2 $9/2 - 9/2$ $3/2 - 3/2$ $9/2 - 11/2$ $5/2 - 3/2$
2366,595 2364,826 2362,019 2360,293 2359,997	5 8 6 8 8	0,35 0,05 0,30 0,30 0,23	5,59 5,29 5,55 5,55 5,48	$a\ {}^{4}F - z\ {}^{4}F^{\circ}$ $a\ {}^{6}D - z\ {}^{6}P^{\circ}$ $a\ {}^{4}F - z\ {}^{4}F^{\circ}$ $a\ {}^{4}F - z\ {}^{4}D^{\circ}$ $a\ {}^{4}F - z\ {}^{4}F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 9/2 - 9/2 \end{array} $
2359,111 2359,104 2354,889 2354,466 2351,198	8 8 5 5 5	5,25 0,11 0,35 2,67 2,66	10,50 5,36 5,61 7,94 7,93	$z\ ^{6}F^{\circ}-e\ ^{6}G$ $a\ ^{6}D-z\ ^{6}P^{\circ}$ $a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{4}H-y\ ^{4}G^{\circ}$ $a\ ^{4}H-y\ ^{4}G^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2348,303 2348,099 2345,327 2344,278 2343,959	8 8 5 8 6	0,08 0,23 2,63 0,12 0,30	5,36 5,51 7,92 5,41 5,59	$a {}^{6}D - z {}^{6}P^{\circ} \ a {}^{4}F - z {}^{4}D^{\circ} \ a {}^{4}H - y {}^{4}G^{\circ} \ a {}^{6}D - z {}^{6}P^{\circ} \ a {}^{4}F - z {}^{4}F^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 9/2 - 7/2 \\ 13/2 - 11/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \end{array}$
2343,492 2338,005 2332,796 2331,306 2327,394	8 8 8 7 7	0,00 0,11 0,05 0,23 0,08	5,29 5,41 5,36 5,55 5,41	$a \ ^{6}D - z \ ^{6}P^{\circ}$ $a \ ^{6}D - z \ ^{6}P^{\circ}$ $a \ ^{6}D - z \ ^{6}P^{\circ}$ $a \ ^{4}F - z \ ^{4}F^{\circ}$ $a \ ^{6}D - z \ ^{6}P^{\circ}$	9/2 $3/2$ $3/2$ $3/2$ $7/2$ $5/2$ $9/2$ $7/2$ $5/2$ $3/2$
2257,788 2256,897 2255,691 2254,066 2251,831	25 10 50 8 80	4,82 4,84 4,79 4,85 4,77	10,30 10,32 10,28 10,34 10,27	$z {}^{6}D^{\circ} - e {}^{6}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 1/2 - 3/2 \\ 9/2 - 11/2 \end{array} $
2249,181 2249,063 2249,063 2247,692 2245,505	25 10 30 35 45	4,84 0,00 4,82 4,79 4,77	10,34 5,51 10,32 10,30 10,28	$z\ ^{6}D^{\circ}-e\ ^{6}F$ $a\ ^{6}D-z\ ^{4}D^{\circ}$ $z\ ^{6}D^{\circ}-e\ ^{6}F$ $z\ ^{6}D^{\circ}-e\ ^{6}F$ $z\ ^{6}D^{\circ}-e\ ^{6}F$	3/2 $3/2$ $9/2$ $7/2$ $5/2$ $5/2$ $5/2$ $7/2$ $9/2$ $9/2$ $9/2$
2244,216 2241,426 2239,047 2237,577 2231,512	8 20 25 20 10	4,84 4,82 4,79 4,77 4,84	10,36 10,34 10,32 10,30 10,39	$z ^{6}D^{\circ} - e ^{6}F$ $z ^{6}D^{\circ} - 32$	3/2 $5/2$ $3/2$ $7/2$ $7/2$ $5/2$ $9/2$ $7/2$ $3/2$ $5/2$
2228,761 2220,453 2220,388	$\begin{array}{c} 30 \\ 6 \\ 25 \end{array}$	4,82 4,85 2,52	10,37 10,43 8,10	$z^{6}D^{\circ}-30$ $z^{6}D^{\circ}-34$ $a^{2}H-z^{2}H^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2, 1/2 \\ 11/2 - 11/2 \end{array} $ 473

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
2219,889 2218,289	20 30	2,66 4,79	8,23 10,38	$a {}^{4}H - y {}^{4}H^{\circ}$ $z {}^{6}D^{\circ} - e {}^{6}P$	$^{11}/_{2}$ — $^{11}/_{2}$ $^{7}/_{2}$ — $^{7}/_{2}$
2215,094 2214,059 2213,679 2211,243 2211,112	10 20 20 12 5	4,82 4,79 2,63 3,88 2,63	10,41 10,39 8,23 9,48 8,23	$z {}^{6}D^{\circ} - 33$ $z {}^{6}D^{\circ} - 32$ $a {}^{4}H - y {}^{4}H^{\circ}$ $b {}^{4}D - x {}^{2}P^{\circ}$ $a {}^{4}H - y {}^{4}H^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 13/2 - 13/2 \\ 1/2 - 1/2 \\ 13/2 - 11/2 \end{array}$
2210,952 2209,049 2208,419 2206,153 2201,595	5 20 30 8 5	2,52 4,77 4,77 4,84 4,82	8,12 10,37 10,38 10,45 10,44	$a^{2}H-z^{2}H^{\circ}$ $z^{6}D^{\circ}-30$ $z^{6}D^{\circ}-e^{6}P$ $z^{6}D^{\circ}-e^{6}P$ $z^{6}D^{\circ}-e^{6}P$	$ \begin{array}{c} 11/2 - 9/2 \\ 9/2 - 7/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2197,273 2192,674 2191,935 2187,868 2187,678	5 5 10 15 10	3,33 3,33 4,78 2,64 2,03	8,98 8,99 10,44 8,30 7,69	$b\ ^{2}P-w\ ^{4}D^{\circ}\ b\ ^{2}P-w\ ^{4}D^{\circ}\ z\ ^{6}D^{\circ}-e\ ^{6}P\ a\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{2}G-y\ ^{4}F^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
2187,444 2185,622 2183,803 2183,468 2183,301	12 8 10 8 12	3,38 3,38 3,26 2,58 2,03	9,04 9,05 8,93 8,25 7,70	$a\ ^{2}F-x\ ^{2}F^{\circ}\ a\ ^{2}F-x\ ^{2}F^{\circ}\ b\ ^{2}H-x\ ^{2}H^{\circ}\ a\ ^{2}H-y\ ^{4}H^{\circ}\ a\ ^{2}G-y\ ^{4}F^{\circ}$	7/2 - 7/2 $7/2 - 5/2$ $9/2 - 9/2$ $9/2 - 9/2$ $7/2 - 9/2$
2181,407 2181,137 2180,8692 2180,255 2177,025	5 8 12 12 10	4,85 4,84 4,77 4,82 2,34	10,53 10,51 10,45 10,50 8,03	$z\ ^{6}D^{\circ}-e\ ^{6}G$ $z\ ^{6}D^{\circ}-e\ ^{6}G$ $z\ ^{6}D^{\circ}-e\ ^{6}G$ $z\ ^{6}D^{\circ}-e\ ^{6}G$ $a\ ^{2}P-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 9/2 - 11/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
2176,826 2175,445 2174,849 2173,720 2173,220	20 25 8 15 20	4,84 2,03 2,64 1,70 3,26	10,53 7,72 8,33 7,40 8,96	$z\ ^{6}D^{\circ}-e\ ^{6}G$ $a\ ^{2}G-z\ ^{2}G^{\circ}$ $a\ ^{2}D-y\ ^{2}D^{\circ}$ $a\ ^{4}P-z\ ^{4}S^{\circ}$ $b\ ^{2}H-w\ ^{4}F^{\circ}$	3/2 - 3/2 $7/2 - 7/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 3/2$ $9/2 - 7/2$
2172,989 2172,679 2170,193 2169,994 2169,950	15 8 5 12 12	2,54 4,82 4,84 3,34 4,77	8,24 10,52 10,55 9,07 10,48	$a\ ^{2}D-x\ ^{4}F^{\circ}\ z\ ^{6}D^{\circ}-f\ ^{4}D\ z\ ^{6}D^{\circ}-f\ ^{4}D\ b\ ^{2}P-y\ ^{2}P^{\circ}\ z\ ^{6}D^{\circ}-e\ ^{6}G$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 9/2 - 9/2 \end{array} $
2169,431 2168,925 2167,880 2167,401 2166,198	10 8 12 12 20	4,82 3,24 3,23 2,52 3,22	10,53 8,95 8,94 8,23 8,93	$z\ ^{6}D^{\circ}-e\ ^{6}G\ b\ ^{2}H-x\ ^{2}H^{\circ}\ a\ ^{4}G-w\ ^{4}F^{\circ}\ a\ ^{2}H-y\ ^{4}H^{\circ}\ a\ ^{4}G-x\ ^{2}H^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 11/2 - 11/2 \\ 5/2 - 3/2 \\ 11/2 - 11/2 \\ 7/2 - 9/2 \end{array} $
2165,555 2164,558 2164,339 2163,370 2162,023	10 25 20 20 20	2,84 3,23 4,82 4,79 1,96	8,56 8,95 10,54 10,52 7,69	$b^{4}F - x^{4}P^{\circ}$ $a^{4}G - w^{4}F^{\circ}$ $z^{6}D^{\circ} - f^{4}D$ $z^{6}D^{\circ} - f^{4}D$ $a^{2}G - z^{2}G^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \\ 9/2 - 9/2 \end{array} $
2161,582 2161,313 2161,161 2159,199 2159,152	20 20 15 25 10	2,52 3,34 3,22 1,96 0,08	8,26 9,07 8,95 7,70 5,81	$a\ ^{2}H-y\ ^{4}H^{\circ}\ b\ ^{2}P-y\ ^{2}P^{\circ}\ a\ ^{4}G-w\ ^{4}F^{\circ}\ a\ ^{2}G-y\ ^{4}F^{\circ}\ a\ ^{6}D-z\ ^{4}P^{\circ}$	$ \begin{array}{c} 11/2 - 9/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 9/2 - 9/2 \\ 5/2 - 5/2 \end{array} $
2158,518 2155,839 2153,373 2153,281 2152,488	25 12 12 5 25	1,96 3,22 2,28 3,19 2,58	7,70 8,97 8,03 8,95 8,33	$a\ ^{2}G-y\ ^{4}F^{\circ}\ a\ ^{4}G-w\ ^{4}F^{\circ}\ a\ ^{2}P-z\ ^{2}P^{\circ}\ b\ ^{2}P-w\ ^{4}P^{\circ}\ b\ ^{4}P-y\ ^{2}D^{\circ}$	9/2 - 9/2 $7/2 - 7/2$ $3/2 - 1/2$ $3/2 - 1/2$ $5/2 - 3/2$
474		-,00	0,00	v = y = D	5/2-5/2

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
2152,373 2151,774 2150,762 2150,618 2147,719	12 25 10 20 15	2,28 2,28 3,24 2,54 3,20	8,03 8,04 9,00 8,30 8,96	$a\ ^{2}P-z\ ^{2}P^{\circ}\ a\ ^{2}P-z\ ^{2}P^{\circ}\ b\ ^{2}H-w\ ^{4}F^{\circ}\ a\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{4}G-w\ ^{4}F^{\circ}$	3/2— $1/2$ $3/2$ — $3/2$ $11/2$ — $9/2$ $5/2$ — $5/2$ $9/2$ — $7/2$
2146,058 2139,6987 2138,103 2137,735 2136,519	10 25 20 15 20	0,05 0,08 2,54 0,11 3,26	5,82 5,87 8,33 5,90 9,07	$a\ ^{6}D-z\ ^{4}P^{\circ}\ a\ ^{6}D-z\ ^{4}P^{\circ}\ a\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{6}D-z\ ^{4}P^{\circ}\ b\ ^{2}H-w\ ^{2}G^{\circ}$	7/2 - 5/2 $ 5/2 - 3/2 $ $ 5/2 - 3/2 $ $ 3/2 - 1/2 $ $ 9/2 - 7/2$
2133,990 2130,548 2130,259 2127,967 2119,050	8 12 15 10 12	3,20 3,24 1,67 3,81 2,52	9,00 9,06 7,49 9,64 8,36	$a\ ^4G-w\ ^4F^\circ\ b\ ^2H-w\ ^2G^\circ\ a\ ^4P-y\ ^4P^\circ\ b\ ^2G-v\ ^2F^\circ\ a\ ^2H-y\ ^2H^\circ$	$ \begin{array}{c} 9/2 - 9/2 \\ 11/2 - 9/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \\ 11/2 - 11/2 \end{array} $
2118,195 2117,633 2116,960 2110,724 2110,240	8 25 25 15 25	2,58 3,15 3,15 2,34 3,82	8,42 9,01 9,00 8,22 9,69	$a\ ^{2}H-y\ ^{2}H^{\circ}\ a\ ^{4}G-w\ ^{4}D^{\circ}\ a\ ^{4}G-w\ ^{4}F^{\circ}\ a\ ^{2}P-z\ ^{2}S^{\circ}\ b\ ^{2}G-v\ ^{2}F^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 11/2 - 9/2 \\ 11/2 - 9/2 \\ 11/2 - 1/2 \\ 7/2 - 7/2 \end{array} $
2109,613 2109,097 2108,139 2107,555 2098,181	25 10 15 10 25	3,20 3,26 1,69 3,24 2,52	9,07 9,14 7,57 9,13 8,42	$egin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 3/2 \\ 9/2 - 9/2 \\ 3/2 - 5/2 \\ 11/2 - 11/2 \\ 11/2 - 9/2 \end{array} $
2097,512 2093,683 2087,527 2080,912 2078,164	25 35 25 20 8	1,69 3,76 2,34 2,03 1,97	7,60 9,69 8,21 7,99 7,92	$a\ ^4P-y\ ^4P^\circ\ b\ ^2G-v\ ^2F^\circ\ a\ ^2P-z\ ^2S^\circ\ a\ ^2G-z\ ^2F^\circ\ a\ ^2G-y\ ^4G^\circ$	3/2 - 3/2 $9/2 - 7/2$ $1/2 - 1/2$ $7/2 - 5/2$ $9/2 - 9/2$
2077,507 2075,683 2074,495 2073,147 2071,821	12 5 8 8 10	2,64 2,28 1,96 1,73 2,28	8,60 8,24 7,94 7,70 8,25	$a\ ^{2}D-x\ ^{4}P^{\circ}\ a\ ^{2}P-x\ ^{4}F^{\circ}\ a\ ^{2}G-y\ ^{4}G^{\circ}\ a\ ^{4}P-z\ ^{2}D^{\circ}\ a\ ^{2}P-x\ ^{4}F^{\circ}$	3/2 - 1/2 $3/2 - 5/2$ $9/2 - 7/2$ $1/2 - 3/2$ $3/2 - 3/2$
2070,330 2069,952 2067,917 2066,005 2064,335	8 10 20 15 25	3,38 3,42 2,64 2,34 1,96	9,37 9,41 8,64 8,34 7,97	$a\ ^{2}F-w\ ^{2}F^{\circ}\ a\ ^{2}F-w\ ^{2}F^{\circ}\ a\ ^{2}D-y\ ^{2}F^{\circ}\ a\ ^{2}P-y\ ^{2}D^{\circ}\ a\ ^{2}G-z\ ^{2}F^{\circ}$	7/2 - 7/2 $5/2 - 5/2$ $3/2 - 5/2$ $1/2 - 3/2$ $9/2 - 7/2$
2063,672 2057,332 2055,270 2051,688 2048,492	25 12 20 25 5	1,96 1,67 2,28 2,03 2,58	7,97 7,69 8,31 8,08 8,63	$a\ ^{2}G-z\ ^{2}F^{\circ}\ a\ ^{4}P-y\ ^{4}F^{\circ}\ a\ ^{2}P-y\ ^{2}D^{\circ}\ a\ ^{2}G-y\ ^{2}G^{\circ}\ a\ ^{2}H-y\ ^{2}F^{\circ}$	9/2 - 7/2 $5/2 - 7/2$ $3/2 - 5/2$ $7/2 - 7/2$ $9/2 - 7/2$
2041,345 2040,687 2036,435 2033,064 2029,182	25 25 20 25 8	1,96 1,96 2,54 2,03 1,96	8,04 8,04 8,63 8,12 8,08	$a\ ^{2}G-y\ ^{2}G^{\circ}\ a\ ^{2}G-y\ ^{2}G^{\circ}\ a\ ^{2}D-y\ ^{2}F^{\circ}\ a\ ^{2}G-z\ ^{2}H^{\circ}\ a\ ^{2}G-y\ ^{2}G^{\circ}$	9/2 - 9/2 $9/2 - 9/2$ $5/2 - 7/2$ $7/2 - 9/2$ $9/2 - 7/2$
2027,778 2020,739 2019,427 2017,090 2016,154	5 25 25 15 10	2,84 1,67 1,96 1,73 2,83	8,96 7,80 8,10 7,86 8,99	$b^{4}F - w^{4}F^{\circ}$ $a^{4}P - x^{4}D^{\circ}$ $a^{2}G - z^{2}H^{\circ}$ $a^{4}P - x^{4}D^{\circ}$ $b^{4}F - w^{4}D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 9/2 - 11/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
2016,092 2015,500 2013,268	10 20 15	2,84 1,70 1,73	8,98 7,84 7,88	$b^{4}F - w^{4}D^{\circ}$ $a^{4}P - x^{4}D^{\circ}$ $a^{4}P - x^{4}D^{\circ}$	$ \frac{\frac{5}{2} - \frac{3}{2}}{\frac{3}{2} - \frac{5}{2}} $ $ \frac{\frac{3}{2} - \frac{5}{2}}{\frac{1}{2} - \frac{1}{2}} $

λ, Å	I	$E_{ m H}$, eV	E_{B} , eV	Transition	J
2010,688 2007,711	25 12	2,58 1,70	8,74 7,86	$a^{2}H - x^{2}G^{\circ}$ $a^{4}P - x^{4}D^{\circ}$	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2007,452 2007,013 2000,368 1999,430 1994,857	15 12 30 10 20	1,67 2,83 2,52 2,80 3,19	7,84 9,01 8,71 9,01 9,41	$a\ ^4P-x\ ^4D^{\circ} \ b\ ^4F-w\ ^4D^{\circ} \ a\ ^2H-x\ ^2G^{\circ} \ b\ ^4F-w\ ^4F^{\circ} \ b\ ^2P-w\ ^2F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 5/2 \\ 11/2 - 9/2 \\ 9/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
1993,289 1964,330 1963,110 1958,121 1948,372	8 12 25 5 10	1,96 2,69 2,69 2,67 2,58	8,18 9,00 9,01 9,01 8,94	$a\ ^{2}G-x\ ^{4}F^{\circ}\ a\ ^{4}H-w\ ^{4}D^{\circ}\ a\ ^{4}H-w\ ^{4}D^{\circ}\ a\ ^{4}H-w\ ^{4}F^{\circ}\ a\ ^{2}H-x\ ^{2}H^{\circ}$	$\begin{array}{c} 9/2 - 9/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 9/2 - 9/2 \\ 9/2 - 9/2 \end{array}$
1938,899 1936,781 1935,296 1932,477 1925,987	8 20 15 15 20	2,85 2,03 1,96 2,64 2,52	9,25 8,42 8,36 9,06 8,96	$b^{4}F - x^{2}D^{\circ}$ $a^{2}G - y^{2}H^{\circ}$ $a^{2}G - y^{2}H^{\circ}$ $a^{2}D - x^{2}F^{\circ}$ $a^{2}H - z^{2}H^{\circ}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{9}{2} - \frac{11}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{11}{2} - \frac{11}{2} $
1922,797 1917,337 1910,669 1904,787 1898,538	20 15 8 15 10	2,54 1,96 2,58 2,54 2,54	8,99 8,42 9,07 9,05 9,08	$a\ ^{2}D-w\ ^{4}D^{\circ}\ a\ ^{2}G-y\ ^{2}H^{\circ}\ a\ ^{2}H-w\ ^{2}G^{\circ}\ a\ ^{2}D-x\ ^{2}F^{\circ}\ a\ ^{2}D-y\ ^{2}P^{\circ}$	$\begin{array}{c} 5/_{2} - 3/_{2} \\ 9/_{2} - 9/_{2} \\ 9/_{2} - 7/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 3/_{2} \end{array}$
1895,675 1894,006 1888,729 1880,976 1877,462	10 10 20 20 20	2,52 2,58 2,58 2,58 2,58 2,52	9,06 9,13 9,14 9,17 9,13	$a\ ^{2}H-w\ ^{2}G^{\circ}\ a\ ^{2}H-w\ ^{2}H^{\circ}\ a\ ^{2}H-w\ ^{2}H^{\circ}\ a\ ^{2}H-y\ ^{2}I^{\circ}\ a\ ^{2}H-w\ ^{2}H^{\circ}$	$\begin{array}{c} 11/2 - 9/2 \\ 9/2 - 11/2 \\ 9/2 - 9/2 \\ 9/2 - 9/2 \\ 11/2 - 11/2 \end{array}$
1876,835 1876,173 1875,536 1864,743 1860,040	15 8 15 20 20	2,03 2,64 4,48 2,52 1,96	8,63 9,25 11,08 9,17 8,62	$a\ ^{2}G-y\ ^{2}F^{\circ}\ a\ ^{2}D-x\ ^{2}D^{\circ}\ b\ ^{2}D-3^{\circ}\ a\ ^{2}H-y\ ^{2}I^{\circ}\ a\ ^{2}G-y\ ^{2}F^{\circ}$	7/2 - 5/2 $3/2 - 3/2$ $3/2 - 5/2$ $11/2 - 13/2$ $9/2 - 7/2$
1859,744 1857,935 1848,768 1848,231 1846,581	15 12 12 5 12	0,98 0,08 2,54 0,05 2,03	7,65 6,75 9,25 6,75 8,74	$a\ ^{4}D-y\ ^{4}D^{\circ}\ a\ ^{6}D-z\ ^{8}P^{\circ}\ a\ ^{2}D-x\ ^{2}D^{\circ}\ a\ ^{6}D-z\ ^{8}P^{\circ}\ a\ ^{2}G-x\ ^{2}G^{\circ}$	7/2 - 7/2 $5/2 - 5/2$, $7/2$ $5/2 - 5/2$ $7/2 - 5/2$ $7/2 - 5/2$, $7/2$ $7/2 - 7/2$
1844,590 1841,701 1835,869 1809,316 1798,163	5 10 15 10 10	5,48 1,04 1,96 2,64 2,54	12,20 7,77 8,71 9,49 9,43	$z^{4}F-e^{4}H$ $a^{4}D-y^{4}D^{\circ}$ $a^{2}G-x^{2}G^{\circ}$ $a^{2}D-x^{2}P^{\circ}$ $a^{2}D-x^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1793 ,371 1787 ,997 1786 ,738 1785 ,262 1772 ,518	10 35 40 40 15	2,03 2,89 2,89 2,89 1,96	8,94 9,82 9,83 9,83 8,96	$a^{2}G-x^{2}H^{\circ}$ $a^{6}S-x^{6}P^{\circ}$ $a^{6}S-x^{6}P^{\circ}$ $a^{6}S-x^{6}P^{\circ}$ $a^{6}S-x^{6}P^{\circ}$ $a^{2}G-x^{2}H^{\circ}$	$ \begin{array}{c} 7/2 - 9/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 9/2 - 11/2 \end{array} $
1761,379 1760,415 1746,816 1732,253 1731,038	25 20 20 15 10	2,03 1,96 1,96 6,21 2,28	9,06 9,01 9,06 13,37 9,44	$a\ ^{2}G-w\ ^{2}G^{\circ}\ a\ ^{2}G-w\ ^{4}F^{\circ}\ a\ ^{2}G-w\ ^{2}G^{\circ}\ c\ ^{4}F-20^{\circ}\ a\ ^{2}P-x\ ^{2}P^{\circ}$	7/2 - 7/2 $9/2 - 9/2$ $9/2 - 9/2$ $9/2 - 7/2$ $9/2 - 7/2$ $3/2 - 3/2$
1726,394 1725,402 1724,963 1724,847 1720,621	12 5 8 8 20	0,38 4,49 0,30 0,38 0,35	7,57 11,68 7,49 7,57 7,54	$a\ ^{4}F-z\ ^{4}G^{\circ}\ b\ ^{2}D-14^{\circ}\ a\ ^{4}F-y\ ^{4}P^{\circ}\ a\ ^{4}F-z\ ^{2}D^{\circ}\ a\ ^{4}F-z\ ^{4}G^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
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λ, Λ	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
1720,042 1715,507 1713,002 1709,678 1708,627	10 12 20 15 8	1,72 1,69 0,30 1,67 0,30	8,92 8,91 7,54 8,91 7,54	$a {}^{4}P - w {}^{4}P^{\circ}$ $a {}^{4}P - w {}^{4}P^{\circ}$ $a {}^{4}F - z {}^{4}G^{\circ}$ $a {}^{4}P - w {}^{4}P^{\circ}$ $a {}^{4}F - z {}^{4}G^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
1702,045 1696,800 1691,289 1690,781 1689,821	25 8 8 8 10	0,23 0,23 0,38 1,66 1,66	7,51 7,54 7,71 8,99 9,00	$a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{4}F-y\ ^{4}F^{\circ}$ $a\ ^{4}P-w\ ^{4}D^{\circ}$ $a\ ^{4}P-w\ ^{4}D^{\circ}$	$ \begin{array}{c} 9/2 - 11/2 \\ 9/2 - 9/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1686,475 1685,953 1685,457 1679,388 1674,716	8 5 8 15 10	0,30 0,35 0,30 2,02 0,38	7,65 7,70 7,65 9,40 7,79	$a\ ^{4}F-y\ ^{4}D^{\circ}$ $a\ ^{4}F-y\ ^{4}F^{\circ}$ $a\ ^{4}F-y\ ^{4}D^{\circ}$ $a\ ^{2}G-w\ ^{2}F^{\circ}$ $a\ ^{4}F-y\ ^{4}D^{\circ}$	7/2 - 7/2 $5/2 - 5/2$ $7/2 - 7/2$ $7/2 - 7/2$ $7/2 - 5/2$ $3/2 - 1/2$
1673,470 1670,759 1663,226 1659,487 1658,785	15 25 15 20 15	1,96 0,23 0,35 0,30 0,23	9,37 7,65 7,80 7,77 7,71	a ² G-w ² F° a ⁴ F-y ⁴ D° a ⁴ F-y ⁴ D° a ⁴ F-y ⁴ D° a ⁴ F-y ⁴ F°	9/2 - 7/2 $9/2 - 7/2$ $5/2 - 3/2$ $7/2 - 5/2$ $9/2 - 9/2$
1654,484 1654,105 1650,709 1649,583 1649,444	5 5 20 20 15	0,38 1,09 1,09 1,07 0,35	7,89 8,59 8,60 8,59 7,87	$a {}^{4}F - x {}^{4}D^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$ $a {}^{4}F - x {}^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
1647,161 1646,187 1643,588 1642,187 1641,761	25 20 15 5 25	1,04 1,07 0,30 3,38 1,04	8,57 8,60 7,85 10,93 8,59	$a {}^{4}D - x {}^{4}P^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$ $a {}^{4}F - x {}^{4}D^{\circ}$ $a {}^{2}F - 1^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
1640,167 1639,403 1637,400 1636,334 1635,389	12 30 15 30 35	0,38 0,12 0,23 0,11 0,98	7,95 7,68 7,80 7,68 8,57	$a {}^{4}F - y {}^{4}G^{\circ}$ $a {}^{6}D - y {}^{6}P^{\circ}$ $a {}^{4}F - x {}^{4}D^{\circ}$ $a {}^{6}D - y {}^{6}P^{\circ}$ $a {}^{4}D - x {}^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 9/2 - 7/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
1634,353 1633,907 1631,124 1629,155 1625,919	20 15 30 30 15	0,11 0,35 0,08 0,08 0,08	7,69 7,93 7,68 7,69 7,71	$a \ ^{6}D - y \ ^{6}P^{\circ}$ $a \ ^{4}F - y \ ^{4}G^{\circ}$ $a \ ^{6}D - y \ ^{6}P^{\circ}$ $a \ ^{6}D - y \ ^{6}P^{\circ}$ $a \ ^{6}D - y \ ^{6}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1625,525 1623,102 1621,685 1618,464 1612,814	20 8 30 25 20	0,30 $0,30$ $0,05$ $0,05$ $0,23$	7,92 7,93 7,69 7,71 7,92	$a {}^{4}F - y {}^{4}G^{\circ}$ $a {}^{4}F - y {}^{4}G^{\circ}$ $a {}^{6}D - y {}^{6}P^{\circ}$ $a {}^{6}D - y {}^{6}P^{\circ}$ $a {}^{4}F - y {}^{4}G^{\circ}$	7/2 - 9/2 $7/2 - 7/2$ $7/2 - 5/2$ $7/2 - 7/2$ $9/2 - 11/2$
1610,933 1608,446 1602,588 1588,295 1584,954	15 35 12 10 15	0,23 $0,00$ $3,94$ $0,38$ $0,35$	7,92 7,71 11,68 8,19 8,17	$a {}^{4}F - y {}^{4}G^{\circ}$ $a {}^{6}D - y {}^{6}P^{\circ}$ $b {}^{2}F - 14^{\circ}$ $a {}^{4}F - x {}^{4}G^{\circ}$ $a {}^{4}F - x {}^{4}G^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1581 ,243 1580 ,635 1574 ,931 1573 ,831 1570 ,248	8 25 20 5 20	0,35 $0,30$ $0,38$ $0,35$ $0,35$	8,19 8,14 8,25 8,22 8,24	$a\ {}^{4}F - z\ {}^{4}G^{\circ}$ $a\ {}^{4}F - x\ {}^{4}G^{\circ}$ $a\ {}^{4}F - x\ {}^{4}F^{\circ}$ $a\ {}^{4}F - x\ {}^{4}F^{\circ}$ $a\ {}^{4}F - x\ {}^{4}F^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array}$
1569 ,670 1568 ,031 1566 ,825	12 8 20	$\begin{array}{c} 0,23 \\ 0,35 \\ 0,23 \end{array}$	8,14 8,25 8,15	a ⁴ F—x ⁴ G° a ⁴ F—x ⁴ F° a ⁴ F—x ⁴ G°	$\frac{9}{2}$ $\frac{11}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{9}{2}$ $\frac{9}{2}$

λ, Å	I	Е _н , eV	E _B , eV	Transition	J
1563,790 1559,106	25 20	0,30 0,23	8,23 8,18	$a {}^{4}F$ — $x {}^{4}F^{\circ}$ $a {}^{4}F$ — $x {}^{4}F^{\circ}$	$\frac{7}{9}/2 - \frac{7}{2}/2$
1558,706 1558,543 1495,311 1476,054 1473,834	10 10 15 10 20	0,38 0,35 2,89 2,80 2,89	8,33 8,30 11,38 11,20 11,29	$a\ ^4F-y\ ^2D^{\circ}\ a\ ^4F-y\ ^2D^{\circ}\ a\ ^6S-w\ ^6P^{\circ}\ b\ ^4F-6^{\circ}\ a\ ^6S-w\ ^6P^{\circ}$	3/2 $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $3/2$ $9/2$ $9/2$ $7/2$ $5/2$ $7/2$
1465,043 1424,747 1424,047 1417,744 1413,707	20 12 8 20 25	2,89 0,30 0,30 2,64 0,98	11,34 8,98 9,01 11,38 9,75	$a\ {}^{6}S - w\ {}^{6}P^{\circ} \ a\ {}^{4}F - w\ {}^{4}D^{\circ} \ a\ {}^{4}F - w\ {}^{4}D^{\circ} \ a\ {}^{2}D - w\ {}^{6}P^{\circ} \ a\ {}^{4}D - w\ {}^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
1412,834 1397,581 1381,250 1364,590 1362,771	12 42 10 12 20	0,23 4,62 2,70 1,97 2,58	9,01 13,41 11,68 11,05 11,68	$a\ ^{4}F-w\ ^{4}D^{\circ}\ a\ ^{2}S-23^{\circ}\ b\ ^{4}P-14^{\circ}\ a\ ^{2}G-2^{\circ}\ b\ ^{4}P-14^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
1360 ,870 1296 ,088 1294 ,914 1291 ,594 1290 ,204	5 20 12 15 15	2,28 1,70 1,70 1,67 1,67	11,38 11,27 11,27 11,26 11,28	$a\ ^{2}P-w\ ^{6}P^{\circ}\ a\ ^{4}P-8^{\circ}\ a\ ^{4}P-9^{\circ}\ a\ ^{4}P-10^{\circ}$	3/2 $3/2$ $3/2$ $1/2$ $3/2$ $3/2$ $1/2$ $3/2$ $3/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$
1275,801 1275,154 1272,638 1272,001 1267,437	20 15 15 25 25	0,11 0,11 0,08 0,08 0,05	9,82 9,83 9,82 9,83 9,82	$a \ ^{6}D - x \ ^{6}P^{c}$ $a \ ^{6}D - x \ ^{6}P^{\circ}$	3/2 $3/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
1266,694 1260,542 1233,660 1220,882 1214,409	20 20 8 5	0,05 0,00 3,38 1,04 0,98	9,83 9,83 13,44 11,19 11,19	$a {}^{6}D - x {}^{6}P^{\circ}$ $a {}^{6}D - x {}^{6}P^{\circ}$ $a {}^{2}F - 26^{\circ}$ $a {}^{4}D - 5^{\circ}$ $a {}^{4}D - 5^{\circ}$	7/2 - 7/2 $9/2 - 7/2$ $7/2 - 7/2$ $5/2 - 7/2$ $5/2 - 7/2$ $7/2 - 7/2$
1213,764 1213,149 1171,606 1165,269 1159,347	20 20 8 12 20	1,07 0,98 2,58 1,04 0,98	11,29 11,20 13,28 11,68 11,68	$a ext{ }^{4}D-11^{\circ}$ $a ext{ }^{4}D-6^{\circ}$ $b ext{ }^{4}P-17^{\circ}$ $a ext{ }^{4}D-14^{\circ}$ $a ext{ }^{4}D-14^{\circ}$	$\begin{array}{c} 3/_{2} - 5/_{2} \\ 7/_{2} - 9/_{2}, 7/_{2} \\ 5/_{2} - 7/_{2}, 5/_{2} \\ 5/_{2} - 5/_{2} \\ 7/_{2} - 5/_{2} \end{array}$
1154,401 1153,955 1153,281 1152,882 1152,440	20 15 20 20 15	0,12 0,12 0,11 0,11 0,12	10,85 10,86 10,86 10,85 10,86	a ⁶ D — y ⁶ F° a ⁶ D — y ⁶ F°	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \end{array}$
1151,163 1150,689 1150,292 1148,693 1148,295	25 20 20 8 30	0,08 0,08 0,08 2,58 0,05	10,85 10,85 10,85 13,37 10,84	$a\ ^{6}D-y\ ^{6}F^{\circ}\ a\ ^{6}D-y\ ^{6}F^{\circ}\ a\ ^{6}D-y\ ^{6}F^{\circ}\ b\ ^{4}P-20^{\circ}\ a\ ^{6}D-y\ ^{6}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1147,413 1146,963 1144,946 1144,052 1143,235	25 15 35 5 25	0,05 0,05 0,00 2,58 0,00	10,85 10,85 10,82 13,42 10,84	a ⁶ D — y ⁶ F° a ⁶ D — y ⁶ F° a ⁶ D — y ⁶ F° b ⁴ P — 24° a ⁶ D — y ⁶ F°	7/2 - 7/2 $7/2 - 5/2$ $9/2 - 11/2$ $5/2 - 7/2$ $9/2 - 9/2$
1142,334 1138,642 1138,039 1133,678 1133,413	25 25 5 25 25	0,00 0,05 0,30 0,00 0,35	10,84 10,93 11,19 10,93 11,29	a ⁶ D-y ⁶ F° a ⁶ D-1° a ⁴ F-5° a ⁶ D-1° a ⁴ F-11°	9/2 $7/2$ $7/2$ $7/2$ $7/2$ $7/2$ $7/2$ $7/2$ $5/2$ $5/2$
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λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
1130,428 1129,777 1128,909 1128,530 1128,180	25 12 20 10 5	0,08 0,23 0,11 2,88 0,30	11,05 11,20 11,09 13,87 11,29	$a \ ^{6}D-2^{\circ}$ $a \ ^{4}F-6^{\circ}$ $a \ ^{6}D-3^{\circ}$ $a \ ^{6}S-29^{\circ}$ $a \ ^{4}F-11^{\circ}$	$\begin{array}{c} 5/2 - \frac{7}{2} \\ 9/2 - \frac{9}{2}, & \frac{7}{2} \\ \frac{3}{2} - \frac{5}{2} \\ \frac{5}{2} - \frac{5}{2} \\ \frac{7}{2} - \frac{5}{2} \end{array}$
1128,074 1126,850 1126,603 1126,425 1124,134	25 20 20 20 20 20	0,12 0,05 0,11 0,08 0,08	11,11 11,05 11,11 11,09 11,11	a ⁶ D-4° a ⁶ D-2° a ⁶ D-4° a ⁶ D-3° a ⁶ D-4°	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 7/_{2} - 7/_{2} \\ 3/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
1122,858 1121,987 1112,086 1111,114 1106,362	25 25 35 15 5	0,05 0,00 0,12 0,05 0,00	11,09 11,04 11,26 11,20 11,20	$a \ ^{6}D - 3^{\circ}$ $a \ ^{6}D - 2^{\circ}$ $a \ ^{6}D - 9^{\circ}$ $a \ ^{6}D - 6^{\circ}$ $a \ ^{6}D - 6^{\circ}$	$ \begin{array}{c} 7/2 - 5/2 \\ 9/2 - 7/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2, 7/2 \\ 9/2 - 9/2, 7/2 \end{array} $
1106,215 1102,385 1101,538 1100,525 1100,026	15 8 20 20 20	0,08 0,11 0,05 0,12 0,08	11,29 11,34 11,29 11,38 11,35	$a\ ^{6}D-11^{\circ} \\ a\ ^{6}D-w\ ^{6}P^{\circ} \\ a\ ^{6}D-w\ ^{6}P^{\circ} \\ a\ ^{6}D-w\ ^{6}P^{\circ} \\ a\ ^{6}D-w\ ^{6}P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
1099,117 1096,886 1096,793 1096,616 1071,596	25 30 20 20 30	$ \begin{array}{c} 0,11\\ 0,00\\ 0,08\\ 0,05\\ 0,08 \end{array} $	11,38 11,29 11,38 11,35 11,64	$a\ ^{6}D-w\ ^{6}P^{\circ}\ a\ ^{6}D-w\ ^{6}P^{\circ}\ a\ ^{6}D-w\ ^{6}P^{\circ}\ a\ ^{6}D-w\ ^{6}P^{\circ}\ a\ ^{6}D-13^{\circ}$	3/2 - 3/2 $9/2 - 7/2$ $5/2 - 3/2$ $7/2 - 5/2$ $5/2 - 7/2$
1069,038 1068,356 1063,982 1062,758 1059,571	15 30 15 20 20	$0,08 \\ 0,05 \\ 0,00 \\ 0,08 \\ 0,05$	11,67 11,64 11,64 11,75 11,75	$a ext{ }^{6}D - 14^{\circ} \\ a ext{ }^{6}D - 13^{\circ} \\ a ext{ }^{6}D - 13^{\circ} \\ a ext{ }^{6}D - 15^{\circ} \\ a ext{ }^{6}D - 15^{\circ} \\$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1055,269 1015,520 1015,083 1012,417 1012,088	$\begin{array}{c} 25 \\ 20 \\ 10 \\ 25 \\ 20 \end{array}$	0,00 1,04 1,07 1,04 1,04	11,75 13,25 13,29 13,28 13,29	$a ^{6}D-15^{\circ} \ a ^{4}D-16^{\circ} \ a ^{4}D-18^{\circ} \ a ^{4}D-17^{\circ} \ a ^{4}D-18^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2, 5/2 \\ 5/2 - 5/2 \end{array} $
1011,037 1007,975 1007,657 995,829 952,470	25 25 20 8 10	0,98 0,98 0,98 0,98 0,98	13,25 13,28 13,29 13,44 13,25	$a\ ^{4}D-16^{\circ} \ a\ ^{4}D-17^{\circ} \ a\ ^{4}D-18^{\circ} \ a\ ^{4}D-26^{\circ} \ a\ ^{4}F-16^{\circ}$	7/2 - 7/2 $7/2 - 7/2$, $5/2$ $7/2 - 5/2$ $7/2 - 5/2$ $7/2 - 7/2$ $9/2 - 7/2$
945,095 943,910 943,267 941,660 939,159	25 15 12 12 20	0,30 0,30 0,23 0,08 0,05	13,42 13,44 13,37 13,25 13,25	$a\ ^{4}F-24^{\circ}\ a\ ^{4}F-26^{\circ}\ a\ ^{4}F-20^{\circ}\ a\ ^{6}D-16^{\circ}\ a\ ^{6}D-16^{\circ}$	7/2 - 7/2 $7/2 - 7/2$ $9/2 - 7/2$ $5/2 - 7/2$ $7/2 - 7/2$
938,967 936,484 932,687 932,244 931,709	10 8 30 30 10	0,08 0,05 0,08 0,11 0,11	13,28 13,28 13,37 13,40 13,41	$a\ ^{6}D-17^{\circ}\ a\ ^{6}D-17^{\circ}\ a\ ^{6}D-20^{\circ}\ a\ ^{6}D-22^{\circ}\ a\ ^{6}D-23^{\circ}$	$\begin{array}{cccc} 5/2 & -7/2, & 5/2 \\ 7/2 & -7/2, & 5/2 \\ 5/2 & -7/2 & 3/2 & -5/2 \\ 3/2 & -3/2 & & 3/2 \end{array}$
931,142 930,558 930,219 930,165 930,030	25 30 30 30 30	0,12 0,08 0,05 0,11 0,08	13,44 13,40 13,37 13,44 13,41	$a\ ^{6}D-25^{\circ} \ a\ ^{6}D-22^{\circ} \ a\ ^{6}D-20^{\circ} \ a\ ^{6}D-25^{\circ} \ a\ ^{6}D-23^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
929,612 929,538 928,470	30 30 20	0,08 0,05 0,08	13,42 13,38 13,44	a ⁶ D-24° a ⁶ D-21° a ⁶ D-25°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
928,407 927,632	30 8	0,05 0,12	13,40 13,49	a ⁶ D-22° a ⁶ D-27°	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
927,476 926,900 926,618 926,220 924,970	30 25 10 60 15	0,05 0,00 0,11 0,00 0,08	13,42 13,37 13,49 13,38 13,49	$a\ ^{6}D-24^{\circ} \ a\ ^{6}D-20^{\circ} \ a\ ^{6}D-27^{\circ} \ a\ ^{6}D-21^{\circ} \ a\ ^{6}D-27^{\circ}$	$^{7/2}$ $^{9/2}$ $^{-7/2}$ $^{9/2}$ $^{-3/2}$ $^{3/2}$ $^{9/2}$ $^{-7/2}$ $^{9/2}$ $^{-7/2}$
923,884 900,360	30 5	0,00 0,11	13,42 13,87	$a \ ^{6}D-24^{\circ} \ a \ ^{6}D-29^{\circ}$	$\frac{9}{3}/\frac{7}{2}$

Fe III, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{6\,5}D_4$ Ionization potential 247 200 cm $^{-1}$; 30,647 eV

LOHIZATION	poten	tiai <i>241</i>	200 cm ⁻¹ ;	30,647 eV	
λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
6185,26 6169,74 6056,36 6054,18 6048,72	9 9 9 11 11	22,94 22,74 22,54 22,54 22,54	24,94 24,75 24,59 24,59 24,59	$e\ ^{5}P-w\ ^{5}D^{\circ}\ e\ ^{3}G-u\ ^{3}H^{\circ}\ f\ ^{5}G-x\ ^{5}G^{\circ}\ f\ ^{5}G-x\ ^{5}G^{\circ}\ f\ ^{5}G-x\ ^{5}G^{\circ}$	2—3 5—6 3—3 4—4 5—5
6036,56 6032,59 5999,54 5953,62 5929,69	13 7 5 6 18	22,54 18,81 18,81 18,79 18,51	24,59 20,87 20,88 20,87 20,60	$f \ ^5G-x \ ^5F^\circ \ e \ ^5S-w \ ^5P^\circ \ e \ ^5S-w \ ^5P^\circ \ e \ ^5D-w \ ^5P^\circ \ e \ ^7S-y \ ^7P^\circ$	6-6 2-3 2-2 4-3 3-2
5920,43 5891,91 5833,93 5363,80 5302,99	7 6 10 8 6	18,79 18,51 18,51 — 18,26	20,88 20,61 20,63 — 20,60	$e^{5}D - w^{5}P^{\circ} \\ e^{7}S - y^{7}P^{\circ} \\ e^{7}S - y^{7}P^{\circ} \\ - e^{7}D - y^{7}P^{\circ}$	$ \begin{array}{r} 3-2 \\ 3-3 \\ 3-4 \\ - \\ 2-2 \end{array} $
5282,29 5276,47 5243,31 5149,33 5100,706	7 7 10 7 10	18,26 18,26 18,27 —	20,61 20,61 20,63 —	e ⁷ D-y ⁷ P° e ⁷ D-y ⁷ P° e ⁷ D-y ⁷ P°	4—3 3—3 5—4 —
5030 ,75 5002 ,02 4559 ,09 4431 ,02 4419 ,59	6 8 6 7 10				
4395,76 4372,81 4310,36 4304,77 4296,85	6 20 12 10 10	8,26 22,91 22,87 22,86 22,86	11,08 25,74 25,74 25,74 25,74	$a\ ^{5}P-z\ ^{5}P^{\circ} \\ w\ ^{5}F^{\circ}-e\ ^{5}G \\ z\ ^{7}F^{\circ}-e\ ^{5}G \\ z\ ^{7}F^{\circ}-e\ ^{7}G \\ z\ ^{7}F^{\circ}-e\ ^{7}G$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 6-7 \\ 5-6 \\ 4-5 \end{array} $
4286,16 4271,47 4249,95 4243,85 4235,54	10 6 7 8 10	22,85 — — — — —	25,74 — — — —	z ¬F°—e ¬G — — — —	3-4 - - - -
4222,39 4210,87 4200,38 4200,06 4189,10	8 10 6 6 7	_ _ _ _	_ _ _ _ _	_ _ _ _	
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λ, Å	1	$E_{ m H}$, eV	$E_{\mathbf{B}}$, eV	Transition	J
4174,27 4166,84 4164,73 4154,98	10 9 20 8	20,63 20,63 	23,61 23,61 	$y \stackrel{7}{^{7}P^{\circ}} - f \stackrel{7}{^{7}D}$ $y \stackrel{7}{^{7}P^{\circ}} - f \stackrel{7}{^{7}D}$ $y \stackrel{7}{^{7}P^{\circ}} - f \stackrel{7}{^{7}D}$	- 44 45 - 32
4140,48 4139,35 4137,76 4122,78 4122,02 4120,90	6 8 10 8 8 8	20,61 20,61 20,61 20,60 20,60 20,60	23,60 23,60 23,61 23,60 23,60 23,60	y 'P' - f 'D' y 'P' - f 'D'	3-2 3-3 3-4 2-1 2-2 2-3
4081,00 3968,71 3954,33 3603,88 3600,94	7 8 12 9 10	20,63 20,88 20,87 11,21 11,22	23,67 24,00 24,00 14,65 14,66	$y^{7}P^{\circ}-f^{7}S$ $w^{5}P^{\circ}-f^{5}D$ $w^{5}P^{\circ}-f^{5}D$ $d^{3}F-z^{3}F^{\circ}$ $d^{3}F-z^{3}F^{\circ}$	4-3 2-3 3-4 2-2 3-3
3586,04 3501,76 3500,28 3499,59 3396,70	9 8 7 7 8	11,22 11,12 11,58 11,13 11,02	14,67 14,66 15,12 14,67 14,67	$d\ ^{3}F-z\ ^{3}F^{\circ}\ c\ ^{3}G-z\ ^{3}F^{\circ}\ e\ ^{3}F-z\ ^{3}G^{\circ}\ c\ ^{3}G-z\ ^{3}F^{\circ}\ b\ ^{3}H-z\ ^{3}H^{\circ}$	4—4 3—3 4—5 4—4 6—6
3382,48 3360,87 3347,70 3339,38 3329,89	$\begin{array}{c} 6 \\ 6 \\ 8 \\ 40 \\ 7 \end{array}$	14,47 14,47 10,99 10,37 10,99	17,83 17,86 14,70 14,08 14,71	$\begin{array}{c} d\ ^{3}G - v\ ^{3}G^{\circ} \\ d\ ^{3}G - v\ ^{3}G^{\circ} \\ b\ ^{3}H - z\ ^{3}H^{\circ} \\ a\ ^{5}F - z\ ^{5}G^{\circ} \\ b\ ^{3}H - z\ ^{3}H^{\circ} \end{array}$	5—5 4—4 5—5 1—2 4—4
3305,22 3292,04 3288,81 3280,56 3276,08	$ \begin{array}{r} 40 \\ 8 \\ 45 \\ 6 \\ 15 \end{array} $	10,33 10,32 10,32 10,31 10,31	14,08 14,08 14,09 14,09 14,09	$a \ ^{5}F - z \ ^{5}G^{\circ}$	2-3 3-3 3-4 4-4 4-5
3273,53 3266,88 3262,46 3218,34 3215,63	6 20 6 6 8	10,31 10,31 14,17 14,62 10,23	14,09 14,10 17,97 18,48 14,08	$a^{5}F - z^{5}G^{\circ}$ $a^{5}F - z^{5}G^{\circ}$ $d^{3}G - x^{1}G^{\circ}$ $d^{1}G - w^{1}G^{\circ}$ $c^{3}D - z^{5}G^{\circ}$	5-5 5-6 5-4 4-4 1-2
3204,76 3178,01 3175,99 3174,09 3136,43	6 10 10 10 10	10,22 11,22 11,22 11,21 11,21	14,08 15,12 15,12 15,12 15,17	c ³ D-z ⁵ G° d ³ F-z ³ G° d ³ F-z ³ G° d ³ F-z ³ G° d ³ F-z ³ D°	2-3 3-4 4-5 2-3 4-3
3120,847 3111,609 3110,841 3107,978 3084,07	8 8	11,15 10,31 11,22 11,13 11,22	15,12 14,29 15,20 15,11 15,24	c ³ G-z ³ G° a ⁵ F-z ⁵ H° d ³ F-z ³ D° c ³ G-z ³ G° d ³ F-y ⁵ D°	5-4 4-5 3-2 4-5 3-2
3054,438 3027,000 3023,83 3018,789 3015,260	6 8 9	10,37 11,00 10,33 10,33 10,31	14,43 15,12 14,43 14,44 14,42	$a {}^{5}F - z {}^{5}D^{\circ}$ $b {}^{3}H - z {}^{3}G^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{5}D^{\circ}$ $a {}^{5}F - z {}^{5}F^{\circ}$	1—1 6—5 2—2 2—3 4—5
3013,467 3007,793 3007,273 3001,617 2977,225	3 6 5 20 7 12	10,31 10,32 18,79 10,31 10,33	14,42 14,44 22,91 14,44 14,50	$a \ ^{5}F - z \ ^{5}F^{\circ}$ $a \ ^{5}F - z \ ^{5}D^{\circ}$ $e \ ^{5}D - w \ ^{5}F^{\circ}$ $a \ ^{5}F - z \ ^{5}F^{\circ}$ $a \ ^{5}F - z \ ^{5}F^{\circ}$	5-5 3-3 4-4 4-4 2-1
2963,230 2958,286 2948,388	6	10,32 10,46 10,31	14,50 14,65 14,51	$a \ ^{5}F - z \ ^{5}F^{\circ}$ $c \ ^{3}F - z \ ^{3}F^{\circ}$ $a \ ^{5}F - z \ ^{5}F^{\circ}$	$ \begin{array}{r} 3-2 \\ 2-2 \\ 4-3 \end{array} $

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	λ, Å	I	E _H , eV	E _B , eV	Transition	J
	2939,55 2923,902	7 8	10,22 10,43	14,43 14,67	$c {}^{3}D - z {}^{5}D^{\circ} \\ c {}^{3}F - z {}^{3}F^{\circ}$	2-2 4-4
	2907,701 2907,497 2905,80 2904,431 2902,47	12 10 8 12 9	11,22 10,31 10,23 11,22 10,23	15,48 14,58 14,49 15,49 14,50	$\begin{array}{c} d\ ^{3}F-y\ ^{3}D^{\circ} \\ a\ ^{5}F-z\ ^{5}D^{\circ} \\ c\ ^{3}D-z\ ^{5}S^{\circ} \\ d\ ^{3}F-y\ ^{3}D^{\circ} \\ c\ ^{3}D-z\ ^{5}F^{\circ} \end{array}$	4-3 $ 5-4 $ $ 1-2 $ $ 3-2 $ $ 1-1$
	2895,076 2858,664 2850,288 2818,624 2813,241	8 7 7 6 10	11 ,21 11 ,22 13 ,13 13 ,58 11 ,14	15,49 15,55 17,48 17,98 15,55	$\begin{array}{c} d\ ^{3}F-y\ ^{3}D^{\circ}\\ d\ ^{3}F-y\ ^{3}F^{\circ}\\ d\ ^{3}D-v\ ^{3}F^{\circ}\\ c\ ^{1}D-x\ ^{1}F^{\circ}\\ c\ ^{3}G-y\ ^{3}F^{\circ} \end{array}$	2-1 4-4 3-4 2-3 5-4
	2803,441 2788,258 2773,306 2705,117 2701,13	6 8 7 8	11,13 11,13 13,58 18,26 18,26	15,55 15,58 18,05 22,84 22,85	$c\ {}^{3}G-y\ {}^{3}F^{\circ}$ $c\ {}^{3}G-y\ {}^{3}F^{\circ}$ $c\ {}^{1}D-x\ {}^{1}D^{\circ}$ $e\ {}^{7}D-z\ {}^{7}F^{\circ}$ $e\ {}^{7}D-z\ {}^{7}F^{\circ}$	4-4 $ 4-3 $ $ 2-2 $ $ 2-2 $ $ 3-3$
	2700,045 2698,414 2696,905 2695,314 2695,150	8 7 7 9 10	18,26 18,26 18,26 18,26 18,27	22,85 22,86 22,86 22,86 22,87	$e^{7}D-z^{7}F^{\circ}$ $e^{7}D-z^{7}F^{\circ}$ $e^{7}D-z^{7}F^{\circ}$ $e^{7}D-z^{7}F^{\circ}$ $e^{7}D-z^{7}F^{\circ}$	$ \begin{array}{r} 2-3 \\ 4-4 \\ 3-4 \\ 4-5 \\ 5-6 \end{array} $
	2678,810 2646,751 2645,39 2617,149 2608,112	6 6 9 8 7	12,03 10,32 10,43 11,59 10,31	16,66 15,00 15,12 16,33 15,06	$c\ ^{1}F-z\ ^{1}G^{\circ}\ a\ ^{5}F-y\ ^{5}F^{\circ}\ c\ ^{3}F-z\ ^{3}G^{\circ}\ c\ ^{1}G-z\ ^{1}H^{\circ}\ a\ ^{5}F-y\ ^{5}F^{\circ}$	3-4 $ 3-3 $ $ 4-5 $ $ 4-5 $ $ 5-5$
	2595,622 2584,038 2582,37 2574,838 2551,098	8 6 8 7 6	9,90 11,58 9,90 9,90 11,47	14,67 16,37 14,70 14,71 16,33	$a\ ^{3}I-z\ ^{3}H^{\circ}\ e\ ^{3}F-x\ ^{3}F^{\circ}\ a\ ^{3}I-z\ ^{3}H^{\circ}\ a\ ^{3}I-z\ ^{3}H^{\circ}\ a\ ^{1}H-z\ ^{1}H^{\circ}$	7-6 3-3 6-5 5-4 5-5
	2511,418 2447,374 2438,174 2418,568 2403,551	6 7 8 7 6	10,31 11,59 5,08 5,08 10,99	15,24 16,66 10,17 10,21 16,15	$a \ ^{5}F - y \ ^{5}D^{\circ}$ $c \ ^{1}G - z \ ^{1}G^{\circ}$ $a \ ^{5}S - z \ ^{7}P^{\circ}$ $a \ ^{5}S - z \ ^{7}P^{\circ}$ $b \ ^{3}H - z \ ^{3}I^{\circ}$	5-4 4-4 2-2 2-3 4-5
	2389,533 2363,51 2338,961 2336,768 2329,905	8 7 10 10 9	11,47 11,13 9,54 11,13 9,55	16,66 16,37 14,84 16,43 14,87	$a\ ^{1}H-z\ ^{1}G^{\circ}$ $c\ ^{3}G-x\ ^{3}F^{\circ}$ $b\ ^{3}D-z\ ^{3}P^{\circ}$ $c\ ^{3}G-y\ ^{3}H^{\circ}$ $b\ ^{3}D-z\ ^{3}P^{\circ}$	5-4 4-3 3-2 4-5 1-1
	2326,948 2324,358 2321,71 2319,466 2319,220	10 8 10 8 10	11,12 13,13 11,46 11,59 9,55	16,45 18,46 16,80 16,94 14,90	$c\ {}^{3}G-y\ {}^{3}H^{\circ}\ d\ {}^{3}D-w\ {}^{3}P^{\circ}\ a\ {}^{1}H-z\ {}^{1}F^{\circ}\ c\ {}^{1}G-w\ {}^{3}F^{\circ}\ b\ {}^{3}D-z\ {}^{3}P^{\circ}$	3-4 2-1 5-6 4-4 1-0
	2315,70 2303,012 2302,808 2295,859 2293,056	10 7 8 15 10	9,14 11,58 12,03 10,90 13,13	14,49 16,96 17,41 16,30 18,54	$c\ ^{3}P-z\ ^{5}S^{\circ}\ e\ ^{3}F-w\ ^{3}F^{\circ}\ c\ ^{1}F-y\ ^{1}F^{\circ}\ b\ ^{1}F-z\ ^{1}D^{\circ}\ d\ ^{3}D-w\ ^{3}P^{\circ}$	2-2 4-3 3-3 3-2 3-2
	2291,850 2278,432 2277,820 2276,870 2274,00	6 6 8 8 8	13,13 11,22 11,22 9,56 12,03	18,54 16,66 16,66 15,00 17,48	$d \ ^{3}D - w \ ^{3}P^{\circ}$ $d \ ^{3}F - z \ ^{1}G^{\circ}$ $d \ ^{3}F - z \ ^{1}G^{\circ}$ $b \ ^{3}D - y \ ^{5}F^{\circ}$ $c \ ^{1}F - v \ ^{3}F^{\circ}$	2-2 3-4 4-4 2-3 3-4
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λ, λ	I	E _H , eV	E _R , eV	Transition	J
2267,42	10	11,46	16,94	$a\ ^{1}H-w\ ^{3}F^{\circ}\ b\ ^{1}F-x\ ^{3}F^{\circ}\ b\ ^{3}G-z\ ^{5}H^{\circ}\ b\ ^{3}D-y\ ^{5}F^{\circ}\ b\ ^{3}G-z\ ^{5}H^{\circ}$	5—4
2261,592	12	10,90	16,38		3—2
2260,547	7	8,77	14,25		3—3
2257,406	8	9,54	15,03		3—4
2243,405	8	8,77	14,29		4—5
2241,54	12	10,77	16,30	$b \ ^{1}D - z \ ^{1}D^{\circ}$ $e \ ^{3}F - x \ ^{3}G^{\circ}$ $e \ ^{3}F - x \ ^{3}G^{\circ}$ $e \ ^{3}F - x \ ^{3}G^{\circ}$ $d \ ^{3}F - y \ ^{5}G^{\circ}$	2—2
2238,155	10	11,58	17,12		4—5
2235,908	10	11,58	17,12		3—4
2235,699	6	11,58	17,12		4—4
2233,654	6	11,58	17,12		3—4
2232,690	10	11,58	17,13	$e^{3}F - x^{3}G^{\circ} \ b^{1}F - y^{3}H^{\circ} \ b^{3}G - z^{5}H^{\circ} \ d^{3}F - y^{5}G^{\circ} \ c^{3}P - y^{5}P^{\circ}$	2—3
2232,548	8	10,90	16,45		3—4
2232,430	10	8,76	14,31		5—6
2229,267	10	11,22	16,77		4—5
2227,848	7	9,15	14,72		1—2
2221,830	10	9,14	14,72	$c\ ^{3}P-y\ ^{5}P^{\circ}\ b\ ^{1}D-x\ ^{3}F^{\circ}\ b\ ^{1}D-x\ ^{3}F^{\circ}\ b\ ^{3}D-z\ ^{3}D^{\circ}\ c\ ^{3}G-y\ ^{5}G^{\circ}$	2-2
2210,073	6	10,77	16,37		2-3
2208,85	10	10,77	16,38		2-2
2202,458	8	9,54	15,17		3-3
2195,532	6	11,13	16,77		4-5
2191,215	8	8,76	14,42	$b\ {}^{3}G - z\ {}^{5}F^{\circ}$ $d\ {}^{3}F - x\ {}^{5}F^{\circ}$ $b\ {}^{3}G - z\ {}^{5}F^{\circ}$ $c\ {}^{3}P - z\ {}^{3}P^{\circ}$ $b\ {}^{3}D - y\ {}^{5}D^{\circ}$	5—5
2186,876	6	11,22	16,88		4—5
2183,980	6	8,76	14,44		5—4
2180,410	12	9,15	14,84		1—2
2179,258	6	9,54	15,23		3—3
2174,658	15	9,14	14,84	$\begin{array}{c} c \ ^{3}P - z \ ^{3}P^{\circ} \\ b \ ^{3}D - y \ ^{5}D^{\circ} \\ c \ ^{3}P - z \ ^{3}P^{\circ} \\ c \ ^{3}P - z \ ^{3}P^{\circ} \\ c \ ^{3}P - z \ ^{3}P^{\circ} \end{array}$	2-2
2173,829	7	9,54	15,24		3-4
2171,045	12	9,17	14,87		0-1
2166,952	12	9,15	14,87		1-1
2161,270	10	9,14	14,87		2-1
2160,655	6	11,58	17,32	$e^{3}F-w^{3}G^{\circ}$ $c^{1}G-y^{1}G^{\circ}$ $c^{3}P-z^{3}P^{\circ}$ $e^{3}F-y^{1}G^{\circ}$ $b^{1}F-z^{1}G^{\circ}$	2-3
2158,472	12	11,59	17,34		4-4
2157,710	12	9,15	14,90		1-0
2152,706	6	11,58	17,34		4-4
2151,776	15	10,90	16,66		3-4
2147,904 2146,339 2146,062 2145,616 2144,743	7 6 8 6 7	8,66 10,99 8,66 8,65 10,34	14,43 16,76 14,43 14,43 16,12	$b\ ^5D-z\ ^5D^c\ b\ ^3H-y\ ^5G^o\ b\ ^5D-z\ ^5D^c\ b\ ^5D-z\ ^5D^o\ b\ ^1I-z\ ^3I^c$	2-1 $4-4$ $2-2$ $1-1$ $6-7$
2144,282	8	8,64	14,42	$b\ ^5D-z\ ^5F^{\circ}\ b\ ^5D-z\ ^5F^{\circ}\ b\ ^5D-z\ ^5D^{\circ}\ b\ ^3D-y\ ^5P^{\circ}\ b\ ^5D-z\ ^5F^{\circ}$	4—5
2143,827	7	8,66	14,44		3—4
2143,470	8	8,66	14,44		3—3
2143,045	7	9,54	15,34		2—3
2137,365	8	8,64	14,44		4—4
2134,861 2123,590 2118,567 2116,588 2113,891	9 8 6 7 6	10,34 10,46 8,65 8,66 12,03	16,15 16,30 14,50 14,51 17,89	$\begin{array}{c} b {}^{1}I - z {}^{3}I^{c} \\ c {}^{3}F - z {}^{1}D^{c} \\ b {}^{5}D - z {}^{5}F^{c} \\ b {}^{5}D - z {}^{5}F^{c} \\ c {}^{1}F - t {}^{3}F^{c} \end{array}$	6-5 $ 2-2 $ $ 1-2 $ $ 2-3 $ $ 3-4$
2107,324	10	8,77	14,65	$b\ ^{3}G-z\ ^{3}F^{c}\ b\ ^{3}G-z\ ^{3}F^{c}\ d\ ^{3}F-x\ ^{3}G^{c}\ d\ ^{3}F-x\ ^{3}G^{c}\ b\ ^{3}G-z\ ^{3}F^{c}$	3-2
2103,799	12	8,77	14,66		4-3
2100,961	8	11,22	17,11		4-5
2099,332	6	11,22	17,12		3-4
2097,692	12	8,76	14,67		5-4
2097,480	15	8,76	14,67	$b\ ^{3}G-z\ ^{3}H^{c}\ b\ ^{5}D-z\ ^{5}D^{c}\ d\ ^{3}F-x\ ^{3}G^{c}$	5—6
2096,430	6	8,66	14,58		3—4
2092,945	6	11,21	17,13		2—3

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2091,312	7	9,56	15,48	b ³ D-y ³ D°	2—2
2090,240	6	8,64	14,57	b ⁵ D-z ⁵ D°	4—4
2090, 139	12	8,77	14,70	$\begin{array}{c} b \ ^{3}G-z \ ^{3}H^{\circ} \\ c \ ^{3}G-x \ ^{3}H^{\circ} \\ b \ ^{3}I)-y \ ^{3}D^{\circ} \\ b \ ^{3}I)-y \ ^{3}D^{\circ} \\ b \ ^{3}I)-y \ ^{3}D^{\circ} \end{array}$	4-5
2090, 053	7	11,12	17,05		3-4
2089, 089	6	9,56	15,49		2-1
2087, 907	7	9,56	15,49		1-1
2087, 132	8	9,54	15,48		3-3
2084,349	10	8,77	14,71	$\begin{array}{c} b \ ^{3}G-z \ ^{3}H^{\circ} \\ c \ ^{3}G-x \ ^{3}H^{\circ} \\ a \ ^{5}S-z \ ^{5}P^{\circ} \\ b \ ^{1}I-z \ ^{1}H^{\circ} \\ a \ ^{5}S-z \ ^{5}P^{\circ} \end{array}$	3-4
2083,530	6	11,13	17,08		4-5
2078,989	14	5,08	11,04		2-3
2070,539	8	10,34	16,33		6-5
2068,243	12	5,08	11,08		2-2
2067,302	6	11,45 $9,54$ $5,08$ $9,56$ $40,34$	17,14	$c\ {}^{3}G - x\ {}^{3}H^{\circ}$	5-6
2061,751	9		15.55	$b\ {}^{3}D - y\ {}^{3}F^{\circ}$	3-4
2061,552	10		11,09	$a\ {}^{5}S - z\ {}^{5}P^{\circ}$	2-1
2059,677	7		15,58	$b\ {}^{3}D - y\ {}^{3}F^{\circ}$	2-3
2058,560	8		16,36	$b\ {}^{1}I - z\ {}^{1}K^{\circ}$	6-7
2057,058	6	9,55	15,58	$\begin{array}{c} b \ ^{3}D - y \ ^{3}F^{\circ} \\ c \ ^{3}P - z \ ^{3}D^{\circ} \\ c \ ^{3}F - x \ ^{3}F^{\circ} \\ b \ ^{5}D - y \ ^{5}P^{\circ} \\ c \ ^{3}P - z \ ^{3}D^{\circ} \end{array}$	1-2
2056,145	7	9,14	15,17		2-3
2055,855	6	10,43	46,46		4-4
2050,739	7	8,64	14,68		4-3
2049,384	7	9,15	15,20		1-2
2039,507 2008,494 2004,143 2000,228 1999,588	6 6 8 9	11,47 8,26 8,25 9,90 9,90	17,55 14,43 14,43 16,10 16,10	$a \ ^{1}II - y \ ^{1}I^{\circ}$ $a \ ^{5}P - z \ ^{5}D^{\circ}$ $a \ ^{5}P - z \ ^{5}D^{\circ}$ $a \ ^{3}I - z \ ^{3}I^{\circ}$ $a \ ^{3}I - z \ ^{3}I^{\circ}$	5-6 1-1 2-2 5-6 6-6
1996,420	12	7,87	14,08	$a \ ^{5}G - z \ ^{5}G^{\circ}$	2-2
1995,563	12	7,87	14,08		3-3
1995,266	7	7,87	14,08		4-3
1994,073	13	7,87	14,09		4-4
1993,262	7	7,87	14,09		5-4
1992,858	6	10,46	16,68	$c\ ^{3}F-y\ ^{3}G^{\circ}$ $a\ ^{3}I-z\ ^{3}I^{\circ}$ $a\ ^{3}I-z\ ^{3}I^{\circ}$ $a\ ^{5}G-z\ ^{5}G^{\circ}$ $a\ ^{5}G-z\ ^{5}G^{\circ}$	2-3
1992,196	9	9,90	16,12		6-7
1992,017	9	9,90	16,12		7-7
1991,613	14	7,87	14,09		5-5
1989,975	7	7,86	14,09		6-5
1987,503	15	7,86	14,10	$a \ ^{5}G - z \ ^{5}G^{\circ}$ $a^{3}I - z \ ^{3}I^{\circ}$ $c \ ^{3}D - x \ ^{3}F^{\circ}$ $a \ ^{5}P - z \ ^{5}S^{\circ}$ $a \ ^{5}P - z \ ^{5}F^{\circ}$	6-6
1984,288	9	9,90	16,15		5-5
1984,027	7	40,21	16,46		3-4
1982,805	8	8,24	14,49		3-2
1982,076	6	8,25	14,50		2-2
1976, 126	8	8,24	14,51	$a {}^{5}P - z {}^{5}F^{\circ}$ $b {}^{3}H - y {}^{3}I^{\circ}$ $c {}^{3}F - y {}^{3}G^{\circ}$ $a {}^{3}I - z {}^{3}K^{\circ}$ $b {}^{5}D - y {}^{5}F^{\circ}$	3-3
1966, 740	8	40,99	47,30		4-5
1965, 309	8	10,50	16,80		3-4
1964, 776	8	9,90	16,21		5-6
1964, 260	7	8,65	14,96		1-1
1964,169 1961,230 1960,318 1959,324 1958,583	8 6 13 8 11	9,90 8,66 9,90 8,65 8,24	16,21 14,98 16,22 14,98 14,57	$\begin{array}{c} a \ ^{3}I - z \ ^{3}K^{\circ} \\ b \ ^{5}D - y \ ^{5}F^{\circ} \\ a \ ^{3}I - z \ ^{3}K^{\circ} \\ b \ ^{5}D - y \ ^{5}F^{\circ} \\ a \ ^{5}P - z \ ^{5}D^{\circ} \end{array}$	6-6 $ 2-2 $ $ 7-8 $ $ 1-2 $ $ 3-4$
1957,938	6	14,59	17,92	$c^{1}G - y^{1}H^{\circ}$ $b^{3}H - y^{3}I^{\circ}$ $b^{5}D - y^{5}F^{\circ}$ $a^{3}I - z^{3}K^{\circ}$ $b^{3}G - z^{3}G^{\circ}$	1—5
1954,975	8	11,00	17,34		5—6
1954,223	10	8,66	15,00		2—3
1953,488	10	9,90	16,24		6—7
1953,322	13	8,77	15,12		3—3

	,	p -V	7	Transition	7
λ, Α	1	E _H , eV	E _B , eV	Transition	J
1952,648 1951,007	11 12	8,77 8,76	15,12 $15,12$	$b\ {}^{3}G-z\ {}^{3}G^{\circ}\ b\ {}^{3}G-z\ {}^{3}G^{\circ}$	4—4 5—5
1950,334 1945,342	10 12	11,02 8,66	17,38 15,03	$b \ ^{3}H - y \ ^{3}I^{\circ}$ $b \ ^{5}D - y \ ^{5}F^{\circ}$	6—7 3—4
1943,481 1940,018	14 8	7,87 $8,64$	14,25 $15,03$	$a \ ^5G-z \ ^5H^\circ \ b \ ^5D-y \ ^5F^\circ$	2—3 4—4
1938,901 1937,345	10 14	11 ,22 7 ,87	17,61 14,27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4—4 3—4 4—5
1931,507 1930,387	14 15	8,64 7,87	15,06 14,29	b ⁵ D-y ⁵ F° a ⁵ G-z ⁵ H°	4—5
1926 ,304 1926 ,013 1924 ,532	18 10 6	$3,73 \\ 8,25 \\ 9,54$	10,16 14,68 15,98	a ⁷ S-z ⁷ P° a ⁵ P-y ⁵ P° b ³ D-y ³ P°	$ \begin{array}{c} 3-2 \\ 2-3 \\ 3-2 \end{array} $
1923,877 1923,003	7 7	$ \begin{array}{c} 3,04 \\ 8,24 \\ 10,32 \end{array} $	14,68 16,77	a ⁵ P-y ⁵ P° a ⁵ F-y ⁵ G°	3—3 3—4
1922,789 1918,480	15 7	7,87 10,50	14,32 16,96	$a\ {}^{5}G-z\ {}^{5}H^{\circ} \\ c\ {}^{3}F-w\ {}^{3}D^{\circ}$	$\begin{array}{c} 5-6 \\ 3-2 \end{array}$
1918,284 1917,960	7 6	$ \begin{array}{c} 8,26 \\ 10,22 \end{array} $	14,72 16,68	$a {}^{5}P - y {}^{5}P^{\circ}$ $c {}^{3}D - x {}^{3}P^{\circ}$	$\begin{array}{c} 1-2 \\ 2-1 \\ c \end{array}$
1917 ,453 1917 ,351	9 8	10,34 10,31	16,81 16,77	$b^{1}I - z^{1}F^{\circ}$ $a^{5}F - y^{5}G^{\circ}$	6—6 4—5
1915,083 1914,056	15 19	7,86 $3,73$	14,34 10,21	a ⁵ G-z ⁵ H° a ⁷ S-z ⁷ P° a ¹ H-x ¹ H°	67 33 55
1911,338 1910,401	7 6	11,47 8,25	17,95 14,74	$a^{5}P-y^{5}P^{\circ}$	2—1
1907,577 1906,814 1906,457	10 6 6	$9,90 \\ 10,23 \\ 10,43$	16,40 16,73 16,94	$a\ ^{3}I-y\ ^{3}H^{\circ}\ c\ ^{3}D-y\ ^{5}G^{\circ}\ c\ ^{3}F-w\ ^{3}F^{\circ}$	7-6 $1-2$ $4-4$
1900,437 1902,402 1901,096	6 9	10,22 10,31	16,73 16,83	$c {}^{3}D - x {}^{3}D^{c}$ $a {}^{5}F - y {}^{5}G^{\circ}$	2—3 5—6
1898,870 1896,803	6 9	$\frac{9,14}{9,90}$	$\substack{15,67\\16,44}$	c ³ P-z ³ S° a ³ I-y ³ H°	2—1 6—5
1895,456 1893,981	$\frac{20}{11}$	$3,73 \\ 9,90$	10,27 16,45	$a {}^{7}S - z {}^{7}P^{\circ}$ $a {}^{3}I - y {}^{3}H^{\circ}$	3—4 5—4
1890 ,669 1887 ,471	13 8	7 ,86 7 ,87	14 ,42 14 ,44	$a \ ^{5}G - z \ ^{5}F^{c}$ $a \ ^{5}G - z \ ^{5}F^{c}$	6—5 4—4
1887 ,197 1886 ,757	8 12	7,87 7,87	14,44 14,44	$a \ {}^{5}G - z \ {}^{5}D^{\circ} \ a \ {}^{5}G - z \ {}^{5}F^{\circ} \ a \ {}^{5}F - x \ {}^{5}F^{\circ}$	4—3 5—4 5—5
1885,125 1884,596	9 8	10,31 8,66	16,88 15,23	b ^5D-y $^5D^c$	3—2
1882,047 1877,989	10 12 ~ 6	$8,65 \\ 8,64 \\ 11,15$	15,24 15,24 17,77	$b\ ^5D-y\ ^5D^{\circ}\ b\ ^5D-y\ ^5D^{\circ}\ c\ ^3G-w\ ^3H^{\circ}$	1—1 4—4 5—6
1872 ,214 1871 ,152 1869 ,828	9 10	7,87 7,87 7,87	14,50 14,50	$ \begin{array}{c} a \ {}^{5}G - z \ {}^{5}F^{\circ} \\ a \ {}^{5}G - z \ {}^{5}F^{\circ} \end{array} $	2—1 3—2
1866,305	9 7	$\frac{7,87}{12,03}$	14,51 18,68	$a {}^{5}G - z {}^{5}F^{\circ}$ $c_{*}{}^{1}F - w {}^{1}F^{\circ}$	4—3 3—3
1865,202 1856,690 1854,826	7 9	8,66 8,66	15,33 $15,34$	b ⁵ D-y ⁵ P° b ⁵ D-y ⁵ P°	2-2 3-3
1852,677	6	11,15	17,84	c 3G — v 3G ${}^\circ$ e 3F — u 3G ${}^\circ$	5—5 4—5
1851 ,261 1849 ,407 1845 ,521	6 7 7	11,57 $10,31$ $10,32$	18,27 17,01 17,04	$a \ ^{5}F - x \ ^{5}D^{\circ}$ $a \ ^{5}F - x \ ^{5}D^{\circ}$	5—4 3—3
1844,547 1838,309	$rac{\dot{6}}{7}$	10,99 11,02	17,72 17,77	$\begin{array}{c} b\ ^{3}H-w\ ^{3}H^{\circ} \\ b\ ^{3}H-w\ ^{3}H^{\circ} \end{array}$	5—5 6—6
1775,983 1770,554	6 6	$8,25 \\ 8,24$	$^{15,23}_{15,24}$	$a \ ^{5}P - y \ ^{5}D^{\circ}$ $a \ ^{5}P - y \ ^{5}D^{\circ}$	2—3 3—4
1611,763	7	11,09	18,79	z $^{5}P^{\circ}$ — $\stackrel{"}{e}$ ^{5}D	1 2 485

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
1611,763 1607,723	7 9	11,09 11,07	18,79 18,79	z ${}^5P^{\circ}-e$ 5D z ${}^5P^{\circ}-e$ 5D	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1601,289	6	11,04	18,79	$z {}^{5}P^{\circ}-e {}^{5}D$	3-3, 2
1601,211	10	11,04	18,79	$z {}^{5}P^{\circ}-e {}^{5}D$	3-4
1595,597	6	11,04	18,81	$z {}^{5}P^{\circ}-e {}^{5}S$	3-2
1550,862	8	10,27	18,26	$z {}^{7}P^{\circ}-e {}^{7}D$	4-4
1550,196	12	10,27	18,27	$z {}^{7}P^{\circ}-e {}^{7}D$	4-5
1539,128	8	10,21	18,26	$z^{7}P^{\circ}-e^{7}D$	3-3
1538,632	10	10,21	18,26	$z^{7}P^{\circ}-e^{7}D$	3-4
1531,864	7	10,17	18,26	$z^{7}P^{\circ}-e^{7}D$	2-1
1531,644	8	10,17	18,26	$z^{7}P^{\circ}-e^{7}D$	2-2
1531,293	6	10,17	18,26	$z^{7}P^{\circ}-e^{7}D$	2-3
1505,166	10	10,27	18,51	$z^{7}P^{\circ}-e^{7}S$ $z^{7}P^{\circ}-e^{7}S$ $z^{7}P^{\circ}-e^{7}S$ $a^{5}D-z^{5}P^{\circ}$ $a^{5}D-z^{5}P^{\circ}$	4-3
1493,640	9	10,21	18,51		3-3
1486,265	7	10,17	18,51		2-3
1131,194	7	0,12	11,07		1-2
1129,19	7	0,12	11,09		1-1
1128,72 1128,02 1126,72 1124,883 1122,526	7 8 6 9	0,09 0,05 0,09 0,05 0,00	11,07 11,04 11,09 11,07 11,04	$a\ ^5D-z\ ^5P^{\circ}\ a\ ^5D-z\ ^5P^{\circ}$	2-2 3-3 2-1 3-2 4-3
1066,181	10	3,05	14,67	$a\ {}^{3}G-z\ {}^{3}F^{\circ}$ $a\ {}^{3}G-z\ {}^{3}H^{\circ}$ $a\ {}^{3}D-y\ {}^{3}D^{\circ}$ $a\ {}^{3}D-y\ {}^{3}D^{\circ}$ $a\ {}^{3}F-z\ {}^{3}F^{\circ}$	5-4
1066,143	10	3,05	14,67		5-6
1063,872	8	3,82	15,47		3-3
1061,708	6	3,80	15,48		2-2
1038,355	6	2,71	14,65		2-2
1035,768 1032,123 1030,924 1026,790 1019,789	6 8 6 6	2,69 2,66 3,09 3,05 3,82	14,66 14,67 15,12 15,12 15,98	$a\ {}^{3}F-z\ {}^{3}F^{\circ}\ a\ {}^{3}F-z\ {}^{3}F^{\circ}\ a\ {}^{3}G-z\ {}^{3}G^{\circ}\ a\ {}^{3}G-z\ {}^{3}G^{\circ}\ a\ {}^{3}D-y\ {}^{3}P^{\circ}$	3-3 4-4 4-4 5-5 3-2
1018,286 1017,745 1017,254 997,599 997,081	8 8 9 6 7	3,81 2,52 2,49 2,70 2,41	15,98 14,70 14,68 15,12 14,84	$a \ ^{3}D - y \ ^{3}P^{\circ}$ $a \ ^{3}H - z \ ^{3}H^{\circ}$ $a \ ^{3}H - z \ ^{3}H^{\circ}$ $a \ ^{3}F - z \ ^{3}G^{\circ}$ $a \ ^{3}P - z \ ^{3}P^{\circ}$	$ \begin{array}{r} 2-2 \\ 5-5 \\ 6-6 \\ 3-4 \\ 2-2 \end{array} $
995,150	6	2,66	15,12	$a\ ^{3}F-z\ ^{3}G^{\circ}\ a\ ^{3}G-y\ ^{3}F^{\circ}\ a\ ^{3}G-y\ ^{3}F^{\circ}\ a\ ^{1}G-z\ ^{1}H^{\circ}\ a\ ^{3}F-z\ ^{3}D^{\circ}$	4-5
994,724	6	3,12	15,58		3-2
993,080	7	3,09	15,57		4-3
991,829	6	3,83	16,33		4-5
991,232	9	2,66	15,17		4-3
990,800	6	2,69	15,20	$a {}^{3}F - z {}^{3}D^{\circ}$	3-2
985,824	8	2,54	15,11	$a {}^{3}H - z {}^{3}G^{\circ}$	4-3
983,877	10	2,52	15,12	$a {}^{3}H - z {}^{3}G^{\circ}$	5-4
981,373	10	2,48	15,12	$a {}^{3}H - z {}^{3}G^{\circ}$	6-5
967,197	6	2,66	15,48	$a {}^{3}F - y {}^{3}D^{\circ}$	4-3
961,901	7	4,44	17,32	$a ^{1}D - y ^{1}D^{\circ}$ $a ^{1}I - z ^{1}I^{\circ}$ $a ^{3}P - z ^{3}S^{\circ}$ $a ^{3}H - z ^{3}I^{\circ}$ $a ^{3}H - z ^{3}K^{\circ}$	2-2
950,344	10	3,76	16,81		6-6
934,703	7	2,41	15,67		2-1
910,961	6	2,54	16,15		4-5
905,338	7	2,52	16,21		5-6
899,417	8	3,76	17,55	$a\ ^{1}I-y\ ^{1}I^{\circ}$ $a\ ^{3}G-w\ ^{3}F^{\circ}$ $a\ ^{3}H-y\ ^{3}H^{\circ}$ $a\ ^{3}H-y\ ^{3}H^{\circ}$ $a\ ^{3}H-y\ ^{3}H^{\circ}$	6-6
892,417	6	3,05	16,94		5-4
891,442	8	2,54	16,45		4-4
891,172	10	2,49	16,40		6-6
890,755	9	2,52	16,44		5-5
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λ, Å	I	$E_{ m H},\;\;$ eV	E _B , eV	Transition	J
883,688	6	3,09	17,12	$a\ {}^{3}G - x\ {}^{3}G^{\circ} \ a\ {}^{3}G - x\ {}^{3}G^{\circ} \ a\ {}^{3}F - x\ {}^{3}D^{\circ} \ a\ {}^{3}F - x\ {}^{3}D^{\circ} \ a\ {}^{1}I - x\ {}^{1}H^{\circ}$	4—4
881,088	7	3,05	17,11		5—5
880,949	6	2,66	16,73		4—3
880,447	6	2,69	16,78		3—2
873,462	8	3,76	17,96		6—5
861,832	10	0,05	14,44	$a \ ^{5}D - z \ ^{5}F^{\circ}$ $a \ ^{5}D - z \ ^{5}D^{\circ}$ $a \ ^{3}P - w \ ^{3}D^{\circ}$ $a \ ^{5}D - z \ ^{5}F^{\circ}$ $a \ ^{5}D - z \ ^{5}F^{\circ}$	3—4
861,761	8	0,05	14,44		3—3
859,838	6	2,41	16,82		2—3
859,721	8	0,00	14,42		4—5
859,626	6	0,09	14,51		2—3
858,602 854,367 851,992 851,842 851,332	6 6 6 7	0,00 2,54 3,09 3,12 2,52	14,44 17,05 17,64 17,67 17,08	$a\ ^{5}D-z\ ^{5}F^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}\ a\ ^{3}G-u\ ^{3}F^{\circ}\ a\ ^{3}G-u\ ^{3}H^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}$	4-4 4-4 4-3 3-2 5-5
851,150	7	3,04	17,61	$a\ {}^{3}G - u\ {}^{3}F^{\circ}$ $a\ {}^{5}D - y\ {}^{5}P^{\circ}$ $a\ {}^{3}G - w\ {}^{3}H^{\circ}$ $a\ {}^{5}D - y\ {}^{5}P^{\circ}$ $a\ {}^{5}D - y\ {}^{5}P^{\circ}$	5-4
847,924	6	0,12	14,74		1-1
847,700	6	3,09	17,72		4-5
847,578	7	0,09	14,72		2-2
847,425	8	0,05	14,68		3-3
846,534	6	0,09	14,74	$a\ ^{5}D-y\ ^{5}P^{\circ}\ a\ ^{3}H-x\ ^{3}H^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}\ a\ ^{3}G-w\ ^{3}H^{\circ}$	2-1
845,925	7	2,49	17,14		6-6
845,408	9	0,05	14,72		3-2
844,284	10	0,00	14,68		4-3
842,020	6	3,04	17,77		5-6
838,048	8	2,52	17,31	$a\ ^{3}H-w\ ^{3}G^{\circ}\ a\ ^{3}H-w\ ^{3}G^{\circ}\ a\ ^{3}F-v\ ^{3}F^{\circ}\ a\ ^{1}G-w\ ^{1}F^{\circ}\ a\ ^{5}D-y\ ^{5}F^{\circ}$	5—4
837,439	7	2,49	17,29		6—5
836,521	7	2,66	17,48		4—4
834,944	6	3,83	18,67		4—3
827,777	6	0,05	15,03		3—4
823,257	6	0,00	15,06	$a\ ^{5}D-y\ ^{5}F^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}$	4-5
817,038	7	0,05	15,23		3-3
816,273	6	0,05	15,24		3-4
816,163	6	0,12	15,30		1-0
814,242	6	0,12	15,32		1-1
\$13,382 811,284 810,940 808,840 807,855	10 8 7 8 8	0,00 $0,05$ $0,05$ $2,54$ $2,52$	15,24 15,33 15,34 16,68 17,86	$a\ ^{5}D-y\ ^{5}D^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}\ a\ ^{5}D-y\ ^{5}P^{\circ}\ a\ ^{3}H-y\ ^{3}G^{\circ}\ a\ ^{3}H-v\ ^{3}G^{\circ}$	4-4 3-2 3-3 4-3 5-4
807,547	9	2,49	17,83	$a \ ^3H - v \ ^3G^{\circ}$ $a \ ^5D - x \ ^5D^{\circ}$	6—5
728,810	6	0,00	17,01		4—4

Fe IV, ground state $1s^2 \, 2s^2 \, 2p^6 \, 3s^2 \, 3p^6 \, 3d^{5} \, ^6S_{5/2}$ Ionization potential $460 \, 278 \, \, \mathrm{cm}^{-1}; \, 57,063 \, \, \mathrm{eV}$

λ, Å	I	E _H , eV	EB' eV	Transition	J
1825,55	8	14,68	21,47	4s 4D-4p 4P°	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
1822,72	2	14,72	21,52	4s 4D-4p 4P°	
1819,29	1	14,66	21,47	4s 4D-4p 4P°	
1815,61	25	14,78	21,60	4s 4D-4p 4P°	
1812,53	1	14,68	21,52	4s 4D-4p 4P°	
1801,53	$\frac{5}{2}$	14,72	21,60	4s ⁴ D — 4p ⁴ P°	5/ ₂ —5/ ₂
1688,44		14,78	22,12	4s ⁴ D — 4p ⁴ F°	7/ ₂ —7/ ₂

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λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
1681 ,45 1680 ,86 1675 ,78	$25 \\ 1 \\ 25$	14,78 14,72 14,72	22,15 22,10 22,12	4s ⁴ D - 4p ⁴ F° 4s ⁴ D - 4p ⁴ F° 4s ⁴ D - 4p ⁴ F°	$\frac{7}{2} - \frac{9}{2}$ $\frac{5}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{7}{2}$
1674,89 1672,18 1669,73 1663,52 1663,21	5 5 2 10 10	14,68 14,68 14,66 13,44 13,40	22,08 22,10 22,08 20,89 20,85	4s 4D-4p 4F° 4s 4D-4p 4F° 4s 4D-4p 4F° 4s 6D-4p 6F° 4s 6D-4p 6F°	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
1662,26 1660,07 1656,61 1656,25 1652,85	20 20 15 10 20	13,48 13,54 13,40 13,61 13,44	20,94 21,00 20,89 21,10 20,94	4s ⁶ D - 4p ⁶ F° 4s ⁶ D - 4p ⁶ F°	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 1/2 - 3/2 \\ 9/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
1647,05 1640,03 1630,99 1579,73 1574,68	45 65 7 5 3 8	13,48 13,54 13,61 13,48 13,40	21,00 21,10 21,21 21,33 21,28	4s ⁶ D - 4p ⁶ F° 4s ⁶ D - 4p ⁶ F° 4s ⁶ D - 4p ⁶ F° 4s ⁶ D - 4p ⁶ D° 4s ⁶ D - 4p ⁶ D°	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 9/2 - 11/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
1571,21 1566,54 1565,05 1563,30 1560,26	10 3 2 10 15	13,44 13,61 13,40 —	21,33 21,52 21,33 —	4s ⁶ D—4p ⁶ D° 4s ⁶ D—4p ⁶ D° 4s ⁶ D—4p ⁶ D° —	$ \frac{\frac{3}{2} - \frac{3}{2}}{\frac{9}{2} - \frac{7}{2}} $ $ \frac{\frac{1}{2} - \frac{3}{2}}{-} $
1559,08 1556,48 1555,01 1552,11 1547,58	15 15 1 15 15	13,54 13,61 — 13,54	21,49 21,58 — 21,52	4s ⁶ D-4p ⁶ P° 4s ⁶ D-4p ⁶ P° - 4s ⁶ D-4p ⁶ D°	⁷ / ₂ — ⁵ / ₂ ⁹ / ₂ — ⁷ / ₂ — ⁷ / ₂ — ⁷ / ₂
1546,03 1542,15 1540,77 1538,67 1524,67	8 45 4 25 15	13,54 13,48 13,61 13,54		$-4s$ ^{6}D ^{-4}p $^{6}P^{\circ}$ ^{4}s ^{6}D ^{-4}p $^{6}D^{\circ}$ ^{4}s ^{6}D ^{-4}p $^{6}D^{\circ}$ ^{4}s ^{6}D ^{-4}p $^{6}D^{\circ}$	$\begin{array}{c} - \\ 7/2 - 7/2 \\ 5/2 - 7/2 \\ 9/2 - 9/2 \\ 7/2 - 9/2 \end{array}$
1487,35 1485,48 1479,65 1477,69 1475,67	5 12 38 5 28	 14,78 19,83 	23,16 28,22	- 4s ⁴ D - 4p ⁴ D ° 4s ² ⁴ F - 4sp ⁴ G ° -	$-\frac{7}{2}$ $-\frac{7}{2}$ $-\frac{7}{2}$ $-\frac{9}{2}$ $-\frac{9}{2}$
1474,52 1472,13 1470,54 1469,92 1469,04	$\begin{array}{c} 2\\35\\2\\20\\37\end{array}$	14,68 14,68 14,66 14,72	23,09 23,10 23,09 23,16	4s ⁴ D-4p ⁴ I)° 4s ⁴ D-4p ⁴ I)° 4s ⁴ D-4p ⁴ D° 4s ⁴ D-4p ⁴ I)°	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 7/2 \\ - \end{array} $
1468 ,11 1464 ,81 1463 ,25 1459 ,92 1455 ,66	$\begin{array}{c} 2 \\ 40 \\ 4 \\ 40 \\ 25 \end{array}$	14,66 19,83 19,65 19,72 19,65	23,10 28,29 28,12 28,22 28,16	$4s^{4}D-4p^{4}D^{\circ}$ $4s^{2} {}^{4}F-4sp^{4}G^{\circ}$ $4s^{2} {}^{4}F-4sp^{4}G^{\circ}$ $4s^{2} {}^{4}F-4sp^{4}G^{\circ}$ $4s^{2} {}^{4}F-4sp^{4}G^{\circ}$	$\begin{array}{c} 1/_2 - 3/_2 \\ 9/_2 - 11/_2 \\ 5/_2 - 5/_2 \\ 7/_2 - 9/_2 \\ 5/_2 - 7/_2 \end{array}$
1453,67 1280,43 1273,49 1271,08 1268,40	15 10 2 15 2	19,59 21,21 21,40 21,21	28,12 30,89 30,83 30,97	4s ² ⁴ F—4sp ⁴ G° 4p ⁶ F—4d ⁶ G° 4p ⁶ F—4d ⁶ G° 4p ⁶ F—4d ⁶ G° —	$ \begin{array}{c} 3/2 - 5/2 \\ 11/2 - 11/2 \\ 9/2 - 9/2 \\ 11/2 - 13/2 \\ - \end{array} $
1265,28 1263,47 1261,72 1259,54 1258,68	15 15 10 30 2	21,10 20,94 20,94	30,89 30,75 — 30,90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} {}^{9/2}_{-}{}^{11/2}_{-} \\ {}^{5/2}_{-}{}^{5/2}_{2} \\ {}^{-}_{-} \\ {}^{5/2}_{-}{}^{7/2}_{2} \end{array}$

λ., Å	I	$E_{ m H}^{}$, eV	EB, eV	Transition	J
1257,29 1254,80 587,6 576,8 574,5	6 10 2 40 50	20,89 20,85 —	30,75 30,64 —	4p 6F°—4d 6G 4p 6P°—4d 6G ————————————————————————————————————	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ - \\ - \\ - \end{array} $
526,60 526,28 525,68	60 75 100	00,00 00,00 00,0	23,5 23,6 23,6	3d ⁵ ⁶ S - 4p ⁶ P° 3d ⁵ ⁶ S - 4p ⁶ P° 3d ⁵ ⁶ S - 4p ⁶ P°	$ \begin{array}{c} -5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $

Fe V, ground state $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^{4\,5}D_0$ Ionization potential 78 eV

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
1554 ,17 1550 ,80 1544 ,50 1543 ,66 1533 ,27	$egin{array}{c} 1 \\ 2 \\ 3 \\ 2 \\ 2 \end{array}$	24,40 24,29 24,20 24,20 24,20	32,38 32,29 32,13 32,23 32,29	$\begin{array}{c} b \ ^{3}F-z \ ^{3}D^{\circ} \\ b \ ^{3}F-z \ ^{3}D^{\circ} \\ b \ ^{3}F-z \ ^{3}F^{\circ} \\ b \ ^{3}F-z \ ^{3}D^{\circ} \\ b \ ^{3}F-z \ ^{3}D^{\circ} \\ b \ ^{3}F-z \ ^{3}D^{\circ} \end{array}$	4-3 3-2 2-3 2-1 2-2
1532,70	4	24,29	32,38	$\begin{array}{c} b \ ^{3}F-z \ ^{3}D^{\circ} \\ b \ ^{3}F-z \ ^{3}G^{\circ} \\ a \ ^{5}F-z \ ^{5}G^{\circ} \\ b \ ^{3}F-z \ ^{3}G^{\circ} \\ a \ ^{5}F-z \ ^{5}G^{\circ} \end{array}$	3—3
1479,49	4	24,40	32,78		4—4
1465,37	3	23,20	31,66		3—3
1464,73	6	24,40	32,87		4—5
1462,67	3	23,11	31,66		1—3
1460 ,86	2	23,27	31,76	$a \ ^{5}F - z \ ^{5}G^{\circ}$ $b \ ^{3}F - y \ ^{5}G^{\circ}$ $a \ ^{5}F - z \ ^{5}G^{\circ}$ $b \ ^{3}F - z \ ^{5}G^{\circ}$ $a \ ^{5}F - z \ ^{5}G^{\circ}$	4-4
1459 ,85	5	24,29	31,76		3-4
1456 ,23	5	23,15	31,66		2-3
1455 ,59	5	24,20	31,66		2-3
1454 ,71	3	23,36	31,88		5-5
1448,91	6	23,20	31,76	$a \ ^{5}F - z \ ^{5}G^{\circ}$ $a \ ^{5}F - z \ ^{5}G^{\circ}$ $a \ ^{5}F - z \ ^{5}G^{\circ}$ $a \ ^{5}F - z \ ^{3}F^{\circ}$ $a \ ^{5}F - z \ ^{5}D^{\circ}$	3—4
1440,59	7	23,27	31,88		4—5
1430,61	8	23,36	32,02		5—6
1420,24	3	24,40	33,13		4—3
1409,51	7	23,36	32,15		5—4
1409,19 1408,19 1406,78 1402,45 1400,30	$\begin{array}{c} 6 \\ 1 \\ 7 \\ 6 \\ 4 \end{array}$	23,20 23,15 24,40 24,29 24,20	32,00 31,95 33,22 33,13 33,05	$a \ ^{5}F - z \ ^{5}D^{\circ}$ $a \ ^{5}F - z \ ^{5}D^{\circ}$ $b \ ^{3}F - z \ ^{3}F^{\circ}$ $b \ ^{3}F - z \ ^{3}F^{\circ}$ $b \ ^{3}F - z \ ^{3}F^{\circ}$	3-2 $ 2-1 $ $ 4-4 $ $ 3-3 $ $ 2-2$
1397,99 1394,77 1389,97 1389,05 1388,07	3 0 1 5	23,20 23,11 23,15 24,29 24,20	32,07 32,00 32,07 33,22 33,13	$a \ ^{5}F-z \ ^{5}D^{\circ}$ $a \ ^{5}F-z \ ^{5}D^{\circ}$ $a \ ^{5}F-z \ ^{5}D^{\circ}$ $b \ ^{3}F-z \ ^{3}F^{\circ}$ $b \ ^{3}F-z \ ^{3}F^{\circ}$	$ \begin{array}{r} 3 - 3 \\ 4 - 2 \\ 2 - 3 \\ 3 - 4 \\ 2 - 3 \end{array} $
1386,33	0	23,36	32,30	$ \begin{array}{c} a \ {}^{5}F - z \ {}^{5}F^{c} \\ a \ {}^{5}F - z \ {}^{5}I)^{\circ} \\ a \ {}^{5}F - z \ {}^{5}F^{c} \\ a \ {}^{5}F - z \ {}^{5}F^{c} \\ a \ {}^{5}F - z \ {}^{5}F^{c} \end{array} $	5-4
1385,32	2	23,20	32,15		3-4
1384,75	1	23,20	32,16		3-2
1384,17	1	23,27	32,23		4-3
1380,18	2	23,11	32,10		1-1
1376,45	6	23,36	32,46	a ⁵ F-z ⁵ F°	5-2 $4-4$ $1-2$ $2-3$ $3-2$
1373,68	6	23,27	32,30	a ⁵ F-z ⁵ F°	
1371,00	4	23,11	32,46	a ⁵ F-z ⁵ F°	
1365,73	3	23,15	32,23	a ⁵ F-z ⁵ F°	
1365,14	3	23,20	32,29	a ⁵ F-z ³ D°	

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
1363,72	3	23,27	32,36	$a^{5}F-z^{5}F^{\circ}$	45
1363,00	4	$\frac{23,20}{23,27}$	$\frac{32,30}{32,30}$	$a {}^{5}F$ — $z {}^{5}F^{\circ}$	3-4
1361,42 1359,41	5 1	23,27 $23,11$	$\begin{array}{c} 32,38 \\ 32,23 \end{array}$	$a {}^{5}F - z {}^{3}D^{\circ} \ a {}^{5}F - z {}^{3}D^{\circ}$	$\begin{array}{c} 4-3 \\ 1-1 \end{array}$
1357,28	1	23,15	32,29	$a {}^{5}F - z {}^{3}D^{\circ}$	2-2
1303,59	1	23,27	32,78	a 5F — z 3G $^{\circ}$	4—4
1302,99	1	23,20	32,72	$a {}^{5}F - z {}^{3}G^{\circ}$	3-3
432,919 432,340	$\frac{1}{3}$	$\substack{3,32 \ 3,33}$	31,95 32,00	$a \ {}^{3}F - z \ {}^{5}D^{\circ}$ $a \ {}^{3}F - z \ {}^{5}D^{\circ}$	$\begin{array}{c} 2-1 \\ 3-2 \end{array}$
431,541	$\ddot{3}$	3,34	32,07	$\stackrel{a}{a} {}^{3}F - \stackrel{z}{z} {}^{5}D^{\circ}$	4-3
430,624	2	3,28	32,07	$a~^3P-z~^5D^\circ$	2-3
430,053	1	3,33	32,16	$a {}^{3}F - z {}^{5}F^{\circ}$	3-2
429,206 428,909	1 5	$3,34 \\ 3,10$	$32,23 \\ 32,00$	$a \ {}^{3}F - z \ {}^{5}F^{\circ} \ a \ {}^{3}P - z \ {}^{5}D^{\circ}$	43 12
428,763	5	3,32	32,23	$a^{3}F-z^{3}D^{\circ}$	$\frac{1}{2}$ $-\frac{2}{1}$
428,292	0	3,28	32,23	$a^{3}P-z^{5}F^{\circ}$	2-3
428,131	3	3,33	32,29	$a {}^{3}F - z {}^{3}D^{\circ}$	3-2
$428,000 \\ 427,918$	$0 \\ 2$	$^{3,32}_{2,98}$	32,29 31,95	$a \ {}^{3}F - z \ {}^{3}D^{\circ} \ a \ {}^{3}P - z \ {}^{5}D^{\circ}$	2—2 0—1
427,782	$\overline{1}$	$\frac{2}{3},74$	32,72	$a \ {}^{3}G - z \ {}^{3}G^{\circ}$	4-3
427,442	2	3,28	32,29	$a~^3P$ — $z~^3D$ $^\circ$	2-2
427,320	1	$\frac{3}{3},77$	32,78	$a {}^{3}G - z {}^{3}G^{\circ}$	5-4
427,190 426,969	$\frac{3}{3}$	3,70 $3,34$	$32,72 \\ 32,38$	$a \ {}^{3}G - z \ {}^{3}G^{\circ} \ a \ {}^{3}F - z \ {}^{3}D^{\circ}$	3—3 4—3
426,814	$\overset{\circ}{4}$	3,74	32,78	$\stackrel{a}{a} \stackrel{r}{^{3}G} = \stackrel{z}{z} \stackrel{b}{^{3}G} \circ$	4-3
426,745	3	3,33	32,38	a 3F — z 3D $^\circ$	3-3
426,609	1	3,10	32,16	$a^{3}P-z^{5}F^{\circ}$	1-2
$426,097 \\ 426,045$	5 5	$\substack{3,77\\3,28}$	$32,87 \ 32,38$	$a {}^{3}G - z {}^{3}G^{\circ}$ $a {}^{3}P - z {}^{3}D^{\circ}$	$ \begin{array}{c} 5 - 5 \\ 2 - 3 \end{array} $
425,840	Ö	2,98	32,10	$a \stackrel{7}{}_{3}P - z \stackrel{5}{}_{5}F^{\circ}$	2—3 0—1
425,589	1	3,74	32,87	$a~^3G$ — $z~^3G^\circ$	4-5
425,476	$\frac{1}{3}$	$\frac{3}{3},10$	32,23	$a {}^{3}P - z {}^{3}D^{\circ}$	1—1
$424,733 \\ 423,833$	$\frac{3}{2}$	$\frac{3,10}{2,98}$	$\begin{array}{c} 32,29 \\ 32,23 \end{array}$	$a {}^{3}P - z {}^{3}D^{\circ}$ $a {}^{3}P - z {}^{3}D^{\circ}$	$\begin{array}{c} 1-2 \\ 0-1 \end{array}$
422,287	6	3,70	33,05	$a {}^{3}G - z {}^{3}F^{\circ}$	3-2
421,765	4	3,74	33,13	a 3G — z 3F $^\circ$	4—3
421 ,682 421 ,045	$\frac{2}{5}$	$^{3,32}_{2,77}$	32,72	$a {}^{3}F - z {}^{3}G^{\circ}$	2—3
420,874	2	$\overset{3,77}{3,33}$	$33,22 \\ 33,22$	$a \ {}^{3}G - z \ {}^{3}F^{\circ}$ $a \ {}^{3}F - z \ {}^{3}G^{\circ}$	5-4 $ 3-4$
420,546	5	3,74	33,22	$a \ ^3G$ — $z \ ^3F$ °	4-4
419,915	3	3,09	32,87	a ^3II-z $^3G^{\circ}$	4—5
418,457 418,033	5 6	$3,09 \ 3,13$	$32,72 \\ 32,78$	$a {}^{3}H - z {}^{3}G^{\circ}$ $a {}^{3}H - z {}^{3}G^{\circ}$	4-3
417,516	ő	3,13	32,78 $32,78$	$\begin{array}{c} a \circ H - z \circ G \\ a \circ H - z \circ G \circ \end{array}$	5—4 4—4
417,382	6	3,16	32,87	$a^{3}H-z^{3}G^{\circ}$	6-5
417,048	1	3,33	33,05	a 3F — z 3F $^\circ$	3-2
$416,910 \\ 416,208$	2 5	$\frac{3}{3}, \frac{32}{34}$	33,05	$a^{3}F-z^{3}F^{\circ}$	2—2
410,200 $415,972$	3	$3,34 \\ 3,33$	33,13 33,13	$a {}^{3}F - z {}^{3}F^{\circ}$ $a {}^{3}F - z {}^{3}F^{\circ}$	4—3 3—3
415,825	1	3,32	33,13	$a {}^{3}F - z {}^{3}F \circ$	3—3 2—3
415,006	4	3,34	33,22	$a~^3F-z~^3F^\circ$	4-4
414,790	1	3,33	33,22	a 3F — z 3F $^{\circ}$	3-4
402,197 $401,639$	$rac{1}{2}$	3,74 $3,70$	34,56	a ³G−y ³G°	4-3
401,030	$\frac{2}{2}$	$\frac{3,70}{3,74}$	$34,56 \\ 34,65$	$a \ ^3G - y \ ^3G^{\circ}$ $a \ ^3G - y \ ^3G^{\circ}$	3—3 4—4
400,625	4	3,77	34,72	$a \ ^3G-y \ ^3G^{\circ}$	5—5
396,902	0	3,33	34,56	$a^{3}F-y^{3}G^{\circ}$	3-3
396,773	3	3,32	31,66	$a^{3}F-z^{3}G^{\circ}$	2—3
490					

λ, Å	I	E _H , eV	E _B , eV	Transition	J
395,789 395,155	$\frac{2}{3}$	3,33 3,34	31 ,76 31 ,88	$a\ {}^{3}F-z\ {}^{3}G^{\circ}\ a\ {}^{3}F-z\ {}^{3}G^{\circ}$	3-4 4-5
393,911 393,270 392,907 388,607 388,500	$\frac{4}{5}$ $\frac{6}{2}$ $\frac{2}{2}$	3,09 3,13 3,16 0,10	31,66 31,76 32,02 32,00	$a\ ^{3}H-z\ ^{3}G^{\circ}\ a\ ^{3}H-z\ ^{3}G^{\circ}\ a\ ^{3}H-z\ ^{3}G^{\circ}\ a\ ^{5}D-z\ ^{5}D^{\circ}\ a\ ^{5}D-z\ ^{5}D^{\circ}$	4—3 5—4 6—6 3—2
387,983 387,775 387,616 387,500 387,199	3 4 4 6 5	0,16 0,00 0,10 0,02 0,16 0,05	32,07 31,95 32,07 32,00 32,15 32,07	$a \ ^5D - z \ ^5D^{\circ}$	4—3 0—1 3—3 1—2 4—4 2—3
386,897	4	0,05	32,10	$a\ ^5D-z\ ^5F^\circ \ a\ ^5D-z\ ^5D^\circ \ a\ ^5D-z\ ^5F^\circ \ a\ ^5D-z\ ^5F^\circ \ a\ ^5D-z\ ^5F^\circ \ a\ ^5D-z\ ^5F^\circ$	2—1
386,783	4	0,10	32,15		3—4
386,737	3	0,10	32,16		3—2
386,585	1	0,16	32,23		4—3
386,483	1	0,02	32,20		1—1
386 ,256	0	0,00	32,10	$a\ ^{5}D-z\ ^{5}F^{\circ}\ a\ ^{5}D-z\ ^{5}F^{\circ}$	0—1
386 ,156	4	0,05	32,16		2—2
385 ,869	5	0,10	32,23		3—3
385 ,740	5	0,16	32,29		4—4
385 ,023	4	0,10	32,29		3—4
384 ,957 384 ,826 384 ,610 384 ,212 383 ,484	6 1 2 3 3	0,16 0,02 0,00 0,02 0,05	32,36 32,23 32,23 32,29 32,38	$a \ ^5D - z \ ^5F^{\circ}$ $a \ ^5D - z \ ^3D^{\circ}$	$ \begin{array}{c} 4-5 \\ 1-1 \\ 0-1 \\ 1-2 \\ 2-3 \end{array} $
381 ,881	4	3,77	36,24	$a\ {}^{3}G - z\ {}^{3}G^{\circ} \ a\ {}^{3}G^{\circ} \ a$	5—5
381 ,671	0	3,77	36,25		5—4
381 ,467	0	3,74	36,24		4—5
381 ,260	3	3,74	36,25		4—4
381 ,152	2	3,74	36,26		4—3
380,664	3	3,70	36,26	$a\ {}^{3}G - z\ {}^{3}G^{\circ}$ $a\ {}^{5}D - z\ {}^{3}G^{\circ}$ $a\ {}^{5}D - z\ {}^{3}G^{\circ}$ $a\ {}^{5}H - z\ {}^{3}G^{\circ}$ $a\ {}^{3}H - z\ {}^{3}G^{\circ}$	3—3
379,294	3	0,10	36,25		3—4
379,032	1	0,16	36,24		4—5
374,864	5	3,16	36,24		6—5
374,464	2	3,13	36,24		5—5
374,240	4	3,13	36,25	$a \ ^{3}H-z \ ^{3}G^{\circ}$ $a \ ^{3}H-z \ ^{3}G^{\circ}$ $a \ ^{5}D-z \ ^{5}P^{\circ}$ $a \ ^{5}D-z \ ^{5}P^{\circ}$ $a \ ^{5}D-z \ ^{5}P^{\circ}$	5-4
373,720	5	3,09	36,26		4-3
366,001	3	0,05	33,92		2-1
365,858	6	0,10	33,98		3-2
365,634	3	0,02	33,92		1-1
365,440	6	0,16	34,08	a ⁵ D-z ⁵ P°	4-3
365,339	3	0,05	33,99	a ⁵ D-z ⁵ P°	2-2
364,973	3	0,02	33,99	a ⁵ D-z ⁵ P°	1-2
364,795	4	0,10	34,08	a ⁵ D-z ⁵ P°	3-3
364,292	3	0,05	34,08	a ⁵ D-z ⁵ P°	2-3

Fe VI, ground state $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^{3-4}F_{3/2}$ Ionization potential 102 eV

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J	
318,364	3	<u> </u>	_		_	
318,364 317,319	3	_	_	-	_	

λ, Å	I	$E_{_{ m H}}$, eV	E _B , eV	Transition	J
315,506 315,027 314,814	3 4 1	_ _ 2,55	<u>-</u> 41,94	_ _ a ² G—z ¹ G°	 7/2 ⁵ /2
314,299 312,263 311,702 311,236	3 7 7 2 1	2,64 3,56 3,62 3,56 2,35	42,32 43,26 43,39 43,39 42,47	$a\ ^{2}G-z\ ^{4}G^{\circ}\ a\ ^{2}H-z\ ^{2}G^{\circ}\ a\ ^{2}H-z\ ^{2}G^{\circ}\ a\ ^{2}H-z\ ^{2}G^{\circ}\ a\ ^{4}P-z\ ^{5}F^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ 9/2 - 7/2 \\ 9/2 - 9/2 \\ 11/2 - 9/2 \\ 9/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
311,138 310,807 310,601 310,274 309,627 308,993	0 4 5 1 3	2,43 2,55 2,64 2,43 2,35	42,32 42,47 42,60 42,47 42,47	$a ext{ }^{4}P - z ext{ }^{4}F^{\circ}$ $a ext{ }^{2}G - z ext{ }^{5}F^{\circ}$ $a ext{ }^{2}G - z ext{ }^{5}F^{\circ}$ $a ext{ }^{4}P - z ext{ }^{5}F^{\circ}$ $a ext{ }^{4}P - z ext{ }^{5}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
308,960 308,664 308,534 308,383 308,187	3 5 4 2 2	2,35 2,43 2,64 2,35 2,32	42,68 42,60 42,82 42,55 42,55	$a ext{ } T - z ext{ } T$ $a ext{ } ^2G - z ext{ } ^4D^{\circ}$ $a ext{ } ^4P - z ext{ } ^2F^{\circ}$ $a ext{ } ^2G - z ext{ } ^4D^{\circ}$ $a ext{ } ^4P - z ext{ } ^4D^{\circ}$ $a ext{ } ^4P - z ext{ } ^4D^{\circ}$	72 - 72 $ 7/2 - 5/2 $ $ 5/2 - 7/2 $ $ 9/2 - 7/2 $ $ 3/2 - 3/2 $ $ 1/2 - 3/2$
308,007 307,884 307,800 307,404 307,375	3 0 3 3 4	2,35 2,55 2,32 2,55 2,35 2,35	42,60 42,82 42,60 42,88 42,68	$a \ ^{4}P - z \ ^{4}D^{\circ}$ $a \ ^{2}G - z \ ^{4}D^{\circ}$ $a \ ^{4}P - z \ ^{4}D^{\circ}$ $a \ ^{4}P - z \ ^{4}D^{\circ}$ $a \ ^{2}G - z \ ^{2}D^{\circ}$ $a \ ^{4}P - z \ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 7/2 - 7/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
307,013 306,922 306,823 306,460 305,837	2 5 2 1	2,35 2,43 2,32 2,43 2,35	42,73 42,82 42,73 42,88 42,88	$a \ ^{4}P - z \ ^{2}D^{\circ}$ $a \ ^{4}P - z \ ^{4}D^{\circ}$ $a \ ^{4}P - z \ ^{2}D^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
305,200 304,551 304,221 303,558 300,997	4 7 7 4 2	2,64 2,55 2,64 2,55 3,53	43,26 43,26 43,39 43,39 44,72	$a \ ^{2}G-z \ ^{2}G^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
299,803 299,579 297,568 297,308 297,131	1 1 8 7 2	3,56 3,53 3,62 3,56 3,56	44,91 44,91 45,28 45,26 45,28	$a\ ^{2}H-y\ ^{4}D^{\circ} \ A-y\ ^{4}D^{\circ} \ a\ ^{2}H-y\ ^{2}G^{\circ} \ a\ ^{3}H-y\ ^{2}G^{\circ} \ a\ ^{2}H-y\ ^{2}G^{\circ} \ a\ ^{2}H-y\ ^{2}G^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ - 7/2 \\ - 7/2 \\ 11/2 - 9/2 \\ 9/2 - 7/2 \\ 9/2 - 9/2 \end{array} $
296,988 296,808 296,723 296,317 295,634	6 5 3 1 4	2,35 2,32 3,53 0,25 0,00	44,10 44,10 45,31 42,09 41,94	$a {}^{4}P - z {}^{4}S^{\circ}$ $a {}^{4}P - z {}^{4}S^{\circ}$ $A - z {}^{4}P$ $a {}^{4}F - z {}^{4}G^{\circ}$ $a {}^{4}F - z {}^{4}G^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ - 5/2 \\ 9/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
295,042 295,014 294,960 294,850 294,665	2 4 4 4 4	$0,25 \\ 0,06 \\ 0,06 \\ 0,15 \\ 0,25$	42,27 41,94 42,09 42,19 42,32	$a \ ^{4}F - z \ ^{4}G^{\circ}$ $a \ ^{4}F - z \ ^{4}G^{\circ}$ $a \ ^{4}F - z \ ^{4}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
294,520 294,339 294,265 294,040 293,966	7 5 7 0 8	0,00 0,15 0,06 2,55 0,15	42,09 42,27 42,19 44,72 42,32	$a\ {}^{4}F$ — $z\ {}^{4}F^{\circ}$ $a\ {}^{4}F$ — $z\ {}^{4}G^{\circ}$ $a\ {}^{4}F$ — $z\ {}^{4}F^{\circ}$ $a\ {}^{2}G$ — $y\ {}^{4}D^{\circ}$ $a\ {}^{4}F$ — $z\ {}^{4}F^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
293,820 293,745 293,488 293,384 293,292	1 8 4 4 4	0,00 0,25 0,25 0,06 2,64	42,19 42,45 42,49 42,32 44,91	$a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{4}F-z\ ^{4}G^{\circ}$ $a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{2}G-y\ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 9/2 - 9/2 \\ 9/2 - 11/2 \\ 5/2 - 7/2 \\ 9/2 - 7/2 \end{array} $

λ, Å	I	$E_{_{ m H}}$, eV	EB, eV	Transition	J
293,214 293,046 292,925 292,736 292,597	1 2 5 7 4	2,32 0,15 0,15 0,25 2,35	44,60 42,45 42,47 42,60 44,60	$a\ ^{4}P-y\ ^{4}D^{\circ}$ $a\ ^{4}F-z\ ^{4}F^{\circ}$ $a\ ^{4}F-z\ ^{5}F^{\circ}$ $a\ ^{4}F-z\ ^{5}F^{\circ}$ $a\ ^{4}P-y\ ^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 5/2 \\ 9/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
292,343 292,038 291,931 291,829 291,800	1 2 0 5 5	0,06 0,15 0,00 2,43 0,06	42,47 42,60 42,47 44,91 42,45	$a\ {}^{4}F - z\ {}^{5}F^{\circ}$ $a\ {}^{4}F - z\ {}^{5}F^{\circ}$ $a\ {}^{4}F - z\ {}^{5}F^{\circ}$ $a\ {}^{4}P - y\ {}^{4}D^{\circ}$ $a\ {}^{4}F - z\ {}^{4}F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 9/2 \end{array} $
291,632 291,473 291,229 291,184 291,020	2 5 6 6 5	3,62 0,15 3,56 0,25 0,00	46,13 42,68 46,13 42,60 42,60	$a^{2}H-z^{2}H^{\circ}$ $a^{4}F-z^{4}D^{\circ}$ $a^{2}H-z^{2}H^{\circ}$ $a^{4}F-z^{5}F^{\circ}$ $a^{4}F-z^{4}D^{\circ}$	$ \begin{array}{c} 11/2 - 9/2 \\ 7/2 - 5/2 \\ 9/2 - 9/2 \\ 9/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
290,890 290,737 290,577 290,499 290,302	2 4 4 2 5	0,06 $2,64$ $0,06$ $0,15$ $2,55$	42,68 45,28 42,73 42,82 45,26	$a {}^{4}F - z {}^{4}D^{\circ}$ $a {}^{2}G - y {}^{2}G^{\circ}$ $a {}^{4}F - z {}^{2}D^{\circ}$ $a {}^{4}F - z {}^{4}D^{\circ}$ $a {}^{2}G - y {}^{2}G^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 9/2 - 9/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \\ 7/2 - 7/2 \end{array} $
290 ,271 290 ,146 290 ,089 290 ,038 289 ,851	6 4 4 4 4	3,62 0,00 0,15 2,43 2,35	46,33 42,73 42,88 45,18 45,18	$a^{2}H - z^{2}H^{\circ}$ $a^{4}F - z^{2}D^{\circ}$ $a^{4}F - z^{2}D^{\circ}$ $a^{4}P - z^{4}P^{\circ}$ $a^{4}P - z^{4}P^{\circ}$	$ \begin{array}{c} 11/2 - 11/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
289,672 289,520 289,468 289,302 289,112	2 4 3 4 5	2,32 0,06 2,35 2,32 2,43	45,13 42,88 45,18 45,18 45,31	$a {}^{4}P - z {}^{4}P^{\circ}$ $a {}^{4}F - z {}^{2}D^{\circ}$ $a {}^{4}P - z {}^{4}P^{\circ}$ $a {}^{4}P - z {}^{4}P^{\circ}$ $a {}^{4}P - z {}^{4}P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
288,551 287,333 284,504 283,770 278,471	4 1 4 5 3	2,35 0,25 2,55 2,64 0,00	45,31 43,39 45,26 46,33 44,52	$a {}^{4}P - z {}^{4}P^{\circ}$ $a {}^{4}F - z {}^{2}G^{\circ}$ $a {}^{2}G - y {}^{2}G^{\circ}$ $a {}^{2}G - z {}^{2}H^{\circ}$ $a {}^{4}F - y {}^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 9/2 - 9/2 \\ 7/2 - 9/2 \\ 9/2 - 11/2 \\ 3/2 - 1/2 \end{array} $
278,339 278,449 277,951 277,610 277,569 276,947	5 5 3 2 6 3	0,06 0,15 0,00 0,06 0,25 0,15	44,60 44,72 44,60 44,72 44,91 44,91	$a ext{ }^{4}F - y ext{ }^{4}D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 9/2 - 7/2 \\ 7/2 - 7/2 \end{array} $

COPPER, Z = 29 Cu I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 S_{1/2}$ Ionization potential $62\,317,2$ cm $^{-1}$; 7,726 eV

			,		
λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
18229 18194 16653 16008 11118,2	5 7 4 5 1	6,19 6,19 6,12 5,35 5,08	6,87 6,87 6,87 6,12 6,19	$4d\ ^2D-4f\ ^2F^\circ \ 4d\ ^2D-4f\ ^2F^\circ \ 5p\ ^2P^\circ-5d\ ^2D \ 5s\ ^2S-5p\ ^2P^\circ \ 4p'\ ^4P^\circ-4d\ ^2D$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2, 3/2 - 3/2 \\ 1/2 - 1/2, 3/2 \end{array} $ $ \begin{array}{c} 1/2 - 1/2, 3/2 \\ 1/2 - 3/2 \end{array} $
10883,3 10771,7 10179,2 10172,00 10146,78	1 2 1 2 10	6,12 7,28 4,97 4,97 7,21	7,26 8,43 6,19 6,19 8,43	$5p \ ^2P^{\circ} - 8s \ ^2S$ $4p'' \ ^2D^{\circ} - 5s'' \ ^2D$ $4p' \ ^4P^{\circ} - 4d \ ^2D$ $4p' \ ^4P^{\circ} - 4d \ ^2D$ $4p'' \ ^2F^{\circ} - 5s'' \ ^2D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
10124,5 9739,6 9530,3 9472,4 9263,54	5 4 5 2 3	6,79 6,12 7,02 7,12 5,69	8,02 7,39 8,32 8,43 7,03	$6p \ ^2P^{\circ} - 5s' \ ^2D$ $5p \ ^2P^{\circ} - 9s \ ^2S$ $4p'' \ ^2D^{\circ} - 5s'' \ ^2D$ $7p \ ^2P^{\circ} - 5s'' \ ^2D$ $4p'' \ ^2P^{\circ} - 7s \ ^2S$	$ \begin{array}{c} 3/_{2} - 5/_{2} \\ 1/_{2}, 3/_{2} - 1/_{2} \\ 5/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \end{array} $
8996,2 8584,0 8408,15 8092,634 7933,130	20 10 20 2000 1500	6,95 5,35 5,35 3,82 3,79	8,32 6,79 6,82 5,35 5,35	$4p'' {}^{2}F^{\circ} - 5s'' {}^{2}D$ $5s {}^{2}S - 6p {}^{2}P^{\circ}$ $5s {}^{2}S - 6p {}^{2}P^{\circ}$ $4p {}^{2}P^{\circ} - 5s {}^{2}S$ $4p {}^{2}P^{\circ} - 5s {}^{2}S$	$ \begin{array}{c} 7/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
7570,09 7452,5 7427,2 7193,56 7154,29	200 2 5 50 5	5,35 7,28 7,28 7,21 7,21	6,98 8,94 8,94 8,93 8,94	$5s^2S - 4p''^2P^\circ$ $4p''^2D^\circ - 4d'^2D$ $4p''^2D^\circ - 4d'^2F$ $4p''^2F^\circ - 4d'^2G$ $4p''^2F^\circ - 4d'^4F$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
7124,66 7039,37 7000,05 6968,34 6935,82	5 25 2 5 5	7,21 6,12 7,02 5,35 7,02 7,28	8,94 7,88 8,78 7,12 8,80 9,06	$4p'' ^2F^{\circ} - 4d' ^2F$ $5p ^2P^{\circ} - 5s' ^4D$ $4p'' ^2D^{\circ} - 4d' ^2S$ $5s ^2S - 7p ^2P^{\circ}$ $4p'' ^2D^{\circ} - 4d' ^4S$ $4p'' ^2D^{\circ} - 4d' ^4D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6920,06 6905,94 6890,90 6889,92 6881,94	50 100 10 10 10	$7,02 \\ 7,02 \\ 7,12 \\ 7,28 \\ 6,98 \\ 7,02$	8,81 8,82 8,92 9,07 8,78 8,82	$4p'' ^{2}D^{\circ}-4d' ^{2}D$ $4p'' ^{2}D^{\circ}-4d' ^{2}F$ $7p ^{2}P^{\circ}-4d' ^{4}P$ $4p'' ^{2}D^{\circ}-4d' ^{4}G$ $4p'' ^{2}P^{\circ}-4d' ^{2}S$ $4p'' ^{2}D^{\circ}-4d' ^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
6840,99 6821,86 6775,64 6741,12 6672,23	3 2 2 100 10	7,28 6,98 6,98 6,95 7,21	9,09 8,80 8,81 8,78 9,06	4p" ² D°—4d' ⁴ F 4p" ² P°—4d' ⁴ S 4p" ² P°—4d' ² D 4p" ² F°—4d' ² G 4p" ² F°—4d' ⁴ G	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 7/2 \end{array} $
6634 ,7 6629 ,67 6621 ,61 6485 ,18 6474 ,20	2 5 30 5 10	6,95 7,21 6,95 7,02 7,02	8,81 9,07 8,82 8,93 8,94	$4p'' {}^{2}F^{\circ} - 4d' {}^{2}D$ $4p'' {}^{2}F^{\circ} - 4d' {}^{4}G$ $4p'' {}^{2}F^{\circ} - 4d' {}^{2}F$ $4p'' {}^{2}D^{\circ} - 4d' {}^{4}D$ $4p'' {}^{2}D^{\circ} - 4d' {}^{4}F$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
6325,45 6268,30 6223,66 6221,11 6147,31	$5 \\ 20 \\ 4 \\ 2 \\ 20$	5,72 6,95 6,95 6,79	7,74 8,92 8,94 8,78	$4p'\ ^2D^{\circ}-5s'\ ^4D$ $4p''\ ^2F^{\circ}-4d'\ ^4G$ $4p''\ ^2F^{\circ}-4d'\ ^4F$ $6p\ ^2P^{\circ}-4d'\ ^2S$	$ \frac{3}{2} - \frac{7}{2} $ $ \frac{7}{2} - \frac{9}{2} $ $ \frac{7}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{1}{2} $
6032,33 5966,59 494	2 3	7,28 7,28	9,33 9,35	4p" 2D°-4d" 2P 4p" 2D°-4d" 2D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$

λ, Å	I	$E_{ m H}$, eV	$E_{_{\mathbf{B}}}$, eV	Transition	J
5856 ,94 5851 ,1	5 2	5,69 7,21	7,80 9,32	4p' ² P°-5s' ⁴ D 4p" ² F°-4d" ² G	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
5782,132 5732,325 5727,96 5700,240 5646,5 5554,935	1500 75 5 1500 2 100	1,64 5,57 7,21 1,64 5,69 5,51	3,79 7,74 9,37 3,82 7,88 7,74	$4s^2 {}^2D - 4p {}^2P^\circ$ $4p' {}^2F^\circ - 5s' {}^4D$ $4p'' {}^2F^\circ - 4d'' {}^2F$ $4s^2 {}^2D - 4p {}^2P^\circ$ $4p' {}^2P^\circ - 5s' {}^4D$ $4p' {}^4P^\circ - 5s' {}^4D$	3/2 - 1/2 $7/2 - 7/2$ $5/2 - 7/2$ $3/2 - 3/2$ $3/2 - 3/2$ $5/2 - 7/2$
5535,78 5463,138 5432,05 5408,34 5391,62	50 150 250 100 450	5,78 5,72 5,52 5,72 5,51	8,02 7,99 7,80 8,02 7,80	$4p'\ ^2D^{\circ}-5s'\ ^2D$ $4p'\ ^2D^{\circ}-5s'\ ^4D$ $4p'\ ^4D^{\circ}-5s'\ ^4D$ $4p'\ ^2D^{\circ}-5s'\ ^2D$ $4p'\ ^4D^{\circ}-5s'\ ^4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
5376,867 5360,030 5357,33 5354,95 5352,666	5 200 3 250 300	5,69 5,69 5,78 5,57 5,42	7,99 7,99 8,09 7,88 7,74	$4p' \ ^{2}P^{\circ} - 5s' \ ^{4}D$ $4p' \ ^{2}P^{\circ} - 5s' \ ^{4}D$ $4p' \ ^{2}D^{\circ} - 5s' \ ^{2}D$ $4p' \ ^{4}D^{\circ} - 5s' \ ^{4}D$ $4p' \ ^{2}F^{\circ} - 5s' \ ^{4}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
5323,78 5292,517 5283,530 5250,52 5237,65	3 1650 5 500 10	5,69 5,39 7,02 5,52 5,72	8,02 7,74 9,37 7,88 8,09	$4p' ^{2}P^{\circ} - 5s' ^{2}D$ $4p' ^{4}D^{\circ} - 5s' ^{4}D$ $4p'' ^{2}D^{\circ} - 4d'' ^{2}F$ $4p' ^{4}D^{\circ} - 5s' ^{4}D$ $4p' ^{2}D^{\circ} - 5s' ^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
5220,070 5218,202 5212,780 5200,87 5158,36	500 2500 140 500 50	3,82 3,82 5,51 5,42 5,69	6,19 6,19 7,88 7,80 8,09	$4p ^{2}P^{\circ} - 4d ^{2}D$ $4p ^{2}P^{\circ} - 4d ^{2}D$ $4p' ^{4}D^{\circ} - 5s' ^{4}D$ $4p' ^{2}F^{\circ} - 5s' ^{4}D$ $4p' ^{2}P^{\circ} - 5s' ^{2}D$	3/2 - 3/2 $3/2 - 5/2$ $5/2 - 3/2$ $5/2 - 5/2$ $3/2 - 3/2$
5153,235 5144,120 5142,7 5115,49 5111,913	2000 550 40 40 300	3,79 5,39 5,68 6,95 5,57	6,19 7,80 8,09 9,37 7,99	$4p ^{2}P^{\circ} - 4d ^{2}D$ $4p' ^{4}D^{\circ} - 5s' ^{4}D$ $4p' ^{2}P^{\circ} - 5s' ^{2}D$ $4p'' ^{2}F^{\circ} - 4d'' ^{2}F$ $4p' ^{4}D^{\circ} - 5s' ^{4}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
5105,541 5076,473 5034,36 5016,611 4866,10	1500 100 100 400 75	1,39 5,57 5,42 5,52 5,78	3,82 8,02 7,88 7,99 8,32	$4s^{2} {}^{2}D - 4p {}^{2}P^{\circ}$ $4p' {}^{2}F^{\circ} - 5s' {}^{2}D$ $4p' {}^{2}F^{\circ} - 5s' {}^{4}D$ $4p' {}^{4}D^{\circ} - 5s' {}^{4}D$ $4p' {}^{2}D^{\circ} - 5s'' {}^{2}D$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
4842,290 4797,042 4794,00 4776,22 4767,49	$25 \\ 20 \\ 150 \\ 20 \\ 75$	5,24 5,15 5,51 5,42 5,72	7,80 7,74 8,09 8,02 8,32	$4p' \ ^4F^{\circ} - 5s' \ ^4D$ $4p' \ ^4F^{\circ} - 5s' \ ^4D$ $4p' \ ^4D^{\circ} - 5s' \ ^2D$ $4p' \ ^2F^{\circ} - 5s'' \ ^2D$ $4p' \ ^2D^{\circ} - 5s'' \ ^2D$	3/2 - 5/2 $5/2 - 7/2$ $5/2 - 3/2$ $5/2 - 5/2$ $3/2 - 5/2$
4704,594 4701,71 4697,490 4677,340 4674,72	450 10 350 3 500	5,10 5,69 5,24 5,78 5,15	7,74 8,32 7,88 8,43 7,80	$4p' \ ^4F^{\circ} - 5s' \ ^4D$ $4p' \ ^2P^{\circ} - 5s'' \ ^2D$ $4p' \ ^4F^{\circ} - 5s' \ ^4D$ $4p' \ ^2D^{\circ} - 5s'' \ ^2D$ $4p' \ ^4F^{\circ} - 5s' \ ^4D$	7/2 - 7/2 $3/2 - 5/2$ $3/2 - 3/2$ $5/2 - 3/2$ $5/2 - 5/2$
4651,124 4642,58 4586,97 4539,695 4530,785	2000 150 1300 800 800	5,07 5,42 5,10 5,15 3,82	7,74 8,09 7,80 7,88 6,55	$4p' ^4F^{\circ} - 5s' ^4D$ $4p' ^2F^{\circ} - 5s' ^2D$ $4p' ^4F^{\circ} - 5s' ^4D$ $4p' ^4F^{\circ} - 5s' ^4D$ $4p ^2P^{\circ} - 6s ^2S$	9/2 - 7/2 $5/2 - 3/2$ $7/2 - 5/2$ $5/2 - 3/2$ $3/2 - 1/2$
4525,112 4513,192 4509,374 4507,35 4480,350	40 50 400 200 500	5,69 5,68 5,24 5,57 3,79	8,43 8,43 7,99 8,32 6,55	$4p' ^{2}P^{\circ} - 5s'' ^{2}D$ $4p' ^{2}P^{\circ} - 5s'' ^{2}D$ $4p' ^{4}F^{\circ} - 5s' ^{4}D$ $4p' ^{2}F^{\circ} - 5s'' ^{2}D$ $4p ^{2}P^{\circ} - 6s ^{2}S$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 1/2 - 1/2 \end{array} $

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λ, Å	I	$E_{ m H}^{}$, eV	$E_{_{ m B}},~{ m eV}$	Transition	J
4415,54	200	5,08	7,88	$4p' ^4P^{\circ} - 5s' ^4D$	$^{1}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$ $^{5}/_{2}$ $^{5}/_{2}$ $^{3}/_{2}$ $^{-5}/_{2}$ $^{3}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$
4397,0	10	5,51	8,32	$4p' ^4D^{\circ} - 5s'' ^2D$	
4378,20	550	4,97	7,80	$4p' ^4P^{\circ} - 5s' ^4D$	
4354,74	10	5,24	8,09	$4p' ^4F^{\circ} - 5s' ^2D$	
4336,00	10	5,57	8,43	$4p' ^4D^{\circ} - 5s'' ^2D$	
4328,68 4275,107 4267,204 4259,401 4253,390	$20 \\ 950 \\ 2 \\ 450 \\ 20$	5,15 4,84 5,52 4,97	8,02 7,74 8,43 7,88	4p' 4F°—5s' 2D 4p' 4P°—5s' 4D 4p' 4D°—5s" 2D 4p' 4P°—5s' 4D —	$ \begin{array}{r} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ - 3/2 \end{array} $
4248,956	150	5,08	7,99	$4p' \ ^4P^{\circ} - 5s' \ ^4D$	$^{1/2}_{2}$ $^{-1/2}_{5/2}$ $^{5/2}_{2}$ $^{-3/2}_{2}$ $^{5/2}_{2}$ $^{-5/2}_{2}$ $^{-5/2}_{2}$
4242,26	30	5,51	8,43	$4p' \ ^4D^{\circ} - 5s'' \ ^2D$	
4230,9	5	5,39	8,32	$4p' \ ^4P^{\circ} - 5s'' \ ^2D$	
4218,8	2	5,15	8,09	$4p' \ ^4F^{\circ} - 5s' \ ^2D$	
4177,758	100	4,84	7,80	$4p' \ ^4P^{\circ} - 5s' \ ^4D$	
4123,287	30	5,42	8,43	$4p' \ ^2F^{\circ} - 5s'' \ ^2D$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \end{array} $
4121,74	10	5,78	8,78	$4p' \ ^2D^{\circ} - 4d' \ ^2P$	
4111,4	3	5,08	8,09	$4p' \ ^4P^{\circ} - 5s' \ ^2D$	
4104,218	25	4,97	7,99	$4p' \ ^4P^{\circ} - 5s' \ ^4D$	
4080,534	15	5,78	8,81	$4p' \ ^2D^{\circ} - 4d' \ ^2D$	
4075,572 4073,224 4069,53 4063,238 4062,641	$50 \\ 20 \\ 6 \\ 650 \\ 2000$	5,78 4,97 4,84 3,82 3,82	8,82 8,02 7,88 6,87 6,87	$4p' ^2D^{\circ} - 4d' ^2F$ $4p' ^4P^{\circ} - 5s' ^2D$ $4p' ^4P^{\circ} - 5s' ^4D$ $4p ^2P^{\circ} - 5d ^2D$ $4p ^2P^{\circ} - 5d ^2D$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4056,78 4056,38 4052,380 4050,617 4027,026	$\begin{array}{c} 35 \\ 35 \\ 2 \\ 20 \\ 10 \end{array}$	3,82 3,82 5,78 5,72 5,72	6,87 6,87 8,84 8,78 8,80	$4p^{2}P^{\circ}-4f^{2}F^{\circ}$ $4p^{2}P^{\circ}-4f^{2}F^{\circ}$ $4p'^{2}D^{\circ}-4d'^{4}D$ $4p'^{2}D^{\circ}-4d'^{2}P$ $4p'^{2}D^{\circ}-4d'^{4}S$	$ \begin{array}{r} 3/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
4022,629	1250	3,79	6,87	$4p^{2}P^{\circ}-5d^{2}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4015,8	10	3,79	6,87	$4p^{2}P^{\circ}-4f^{2}F^{\circ}$	
4010,836	8	5,72	8,81	$4p'^{2}D^{\circ}-4d'^{2}D$	
4003,028	45	5,69	8,78	$4p'^{2}P^{\circ}-4d'^{2}P$	
3998,018	3	5,72	8,82	$4p'^{2}D^{\circ}-4d'^{4}P$	
3979,954 3975,7 3964,16 3951,616 3946,938	5 5 2 3	5,69 4,97 5,69 5,69 5,78	8,80 8,09 8,81 8,82 8,92	$4p' ^{2}P^{\circ} - 4d' ^{4}S$ $4p' ^{4}P^{\circ} - 5s' ^{2}D$ $4p' ^{2}P^{\circ} - 4d' ^{2}D$ $4p' ^{2}P^{\circ} - 4d' ^{4}P$ $4p' ^{2}D^{\circ} - 4d' ^{4}P$	3/2 - 3/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $5/2 - 3/2$
3933,027	5	5,78	8,93	4p' 2D°—4d' 2G	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3925,274	8	5,78	8,93	4p' 2D°—4d' 4D	
3921,267	5	5,78	8,94	4p' 2D°—4d' 4F	
3899,22	8	4,84	8,02	4p' 4P°—5s' 2D	
3888,40	4	5,72	8,91	4p' 2D°—4d' 4P	
3885,92 3881,714 3862,781 3861,747 3860,898	3 5 5 250 5	6,12 5,72 6,12 3,82 5,72	9,31 8,92 9,33 7,03 8,93	$5p\ ^{2}P^{\circ}-4d\ ''\ ^{2}P$ $4p'\ ^{2}D^{\circ}-4d'\ ^{4}P$ $5p\ ^{2}P^{\circ}-4d\ ''\ ^{2}P$ $4p\ ^{2}P^{\circ}-7s\ ^{2}S$ $4p'\ ^{2}D^{\circ}-4d'\ ^{4}D$	3/2, $1/2$ — $1/2$ $3/2$ — $3/2$ $3/2$, $1/2$ — $3/2$ $3/2$ — $1/2$ $3/2$ — $1/2$ $3/2$ — $5/2$
3860 ,472	600	5,57	8,78	$4p' \ ^{2}F^{\circ}$ — $4d' \ ^{2}G$	7/2 - 9/2 $3/2 - 1/2$ $3/2 - 3/2$ $1/2 - 1/2$ $7/2 - 7/2$
3844 ,51	4	5,69	8,91	$4p' \ ^{2}P^{\circ}$ — $4d' \ ^{4}P$	
3837 ,976	5	5,69	8,92	$4p' \ ^{2}P^{\circ}$ — $4d' \ ^{4}P$	
3825 ,047	100	3,79	7,03	$4p \ ^{2}P^{\circ}$ — $7s \ ^{2}S$	
3820 ,884	60	5,57	8,82	$4p' \ ^{2}F^{\circ}$ — $4d' \ ^{2}F$	
3817,490	5	5,69	8,93	$4p' ^{2}P^{\circ} - 4d' ^{4}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
3813,542	10	5,57	8,82	$4p' ^{2}F^{\circ} - 4d' ^{4}P$	
3811,95	8	5,69	8,94	$4p' ^{2}P^{\circ} - 4d' ^{2}D$	

λ, Å	I	E _H , eV	EB, eV	Transition	J
3805,232 3803,49	100 5	5,69 5,68	8,94 8,94	4p' 2P°—4d' 2P 4p' 2P°—4d' 2D	$\frac{3}{2}$ $\frac{-1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
3800,502 3799,88 3797,245 3785,49 3780,045	30 10 8 5 5	5,57 5,52 5,57 5,45 5,51	8,84 8,78 8,84 8,43 8,78	$4p' \ ^2F^{\circ} - 4d' \ ^4D$ $4p' \ ^4D^{\circ} - 4d' \ ^2P$ $4p' \ ^2F^{\circ} - 4d' \ ^4F$ $4p' \ ^4F^{\circ} - 5s'' \ ^2D$ $4p' \ ^4D^{\circ} - 4d' \ ^2P$	$ \begin{array}{c} 7/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3779,067 3771,904 3764,837 3759,492 3758,296	2 100 5 60 5	5,52 5,78 5,52 5,51 5,78	8,80 9,06 8,81 8,80 9,07	$4p' \ ^4D^{\circ} - 4d' \ ^4S$ $4p' \ ^2D^{\circ} - 4d' \ ^4G$ $4p' \ ^4D^{\circ} - 4d' \ ^2D$ $4p' \ ^4D^{\circ} - 4d' \ ^4S$ $4p' \ ^2D^{\circ} - 4d' \ ^4G$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
3753,519 3745,356 3743,363 3741,242 3734,180	8 20 3 450 200	5,52 5,51 5,78 5,51 5,51	8,82 8,81 9,09 8,82 8,82	$4p' \ ^4D^{\circ} - 4d' \ ^4P$ $4p' \ ^4D^{\circ} - 4d' \ ^2D$ $4p' \ ^2D^{\circ} - 4d' \ ^4F$ $4p' \ ^4D^{\circ} - 4d' \ ^2F$ $4p' \ ^4D^{\circ} - 4d' \ ^4P$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
3721,666 3720,774 3712.009 3707,42 3701,070	8 150 30 4 5	5,51 1,64 5,72 5,57 5,57	8,84 4,97 9,06 8,91 8,92	$4p' \ ^4D^{\circ} - 4d' \ ^4D$ $4s^2 \ ^2D - 4p' \ ^4P^{\circ}$ $4p' \ ^2D^{\circ} - 4d' \ ^4D$ $4p' \ ^4D^{\circ} - 4d' \ ^4P$ $4p' \ ^4D^{\circ} - 4d' \ ^4P$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
3700 ,536 3699 ,097 3695 ,358 3687 ,708 3687 ,438	$250 \\ 10 \\ 8 \\ 40 \\ 400$	5,57 5,72 5,57 3,82 3,82	8,92 9,07 8,93 7,18 7,18	$4p' {}^{2}F^{\circ}$ — $4d' {}^{4}G$ $4p' {}^{2}D^{\circ}$ — $4d' {}^{4}G$ $4p' {}^{2}F^{\circ}$ — $4d' {}^{2}G$ $4p {}^{2}P^{\circ}$ — $6d {}^{2}D$ $4p {}^{2}P^{\circ}$ — $6d {}^{2}D$	$\begin{array}{c} {}^{7}/{}_{2} - {}^{9}/{}_{2} \\ {}^{3}/{}_{2} - {}^{5}/{}_{2} \\ {}^{7}/{}_{2} - {}^{7}/{}_{2} \\ {}^{3}/{}_{2} - {}^{3}/{}_{2} \\ {}^{3}/{}_{2} - {}^{5}/{}_{2} \end{array}$
3684,930 3684,672 3676,878 3671,953 3665,735	200 450 50 100 125	5,57 5,72 5,57 5,69 5,42	8,94 9,09 8,94 9,06 8,80	$4p' {}^{2}F^{\circ} - 4d' {}^{4}F$ $4p' {}^{2}D^{\circ} - 4d' {}^{4}F$ $4p' {}^{4}D^{\circ} - 4d' {}^{2}D$ $4p' {}^{2}P^{\circ} - 4d' {}^{4}D$ $4p' {}^{2}F^{\circ} - 4d' {}^{4}S$	7/2 - 7/2 $3/2 - 5/2$ $1/2 - 3/2$ $3/2 - 3/2$ $5/2 - 3/2$
3664,08 3659,353 3656,785 3655,859 3654,243	125 600	5,68 5,69 5,52 5,39 3,79	9,06 9,07 8,91 8,78 7,18	$4p' ^{2}P^{\circ} - 4d' ^{4}D$ $4p' ^{2}P^{\circ} - 4d' ^{4}G$ $4p' ^{4}D^{\circ} - 4d' ^{4}P$ $4p' ^{4}D^{\circ} - 4d' ^{2}G$ $4p ^{2}P^{\circ} - 6d ^{2}D$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 3/_{2} - 1/_{2} \\ 7/_{2} - 9/_{2} \\ 1/_{2} - 3/_{2} \end{array}$
3652,34 3650,855 3648,383 3645,232 3643,632	125 250	5,42 5,52 5,42 5,69 5,69	8,81 8,92 8,82 9,09 9,09	$4p' ^{2}F^{\circ}$ — $4d' ^{2}D$ $4p' ^{4}D^{\circ}$ — $4d' ^{4}P$ $4p' ^{2}F^{\circ}$ — $4d' ^{2}F$ $4p' ^{2}P^{\circ}$ — $4d' ^{4}F$ $4p' ^{2}P^{\circ}$ — $4d' ^{4}F$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
3641,693 3635,916 3632,558 3632,308 3629,771	$\begin{array}{ccc} 5 & 250 \\ 8 & 50 \\ 8 & 5 \end{array}$	5,42 5,68 5,51 5,52 5,42	8,82 9,09 8,92 8,93 8,84	4p' 2F°-4d' 4P 4p' 2P°-4d' 4F 4p' 4D°-4d' 4P 4p' 4D°-4d' 4D 4p' 2F°-4d' 4D	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
3627,32 3624,236 3621,24 3620,35 3614,218	$\begin{array}{ccc} 5 & 600 \\ 2 & 225 \end{array}$	5,52 5,39 5,52 5,39 5,51	8,94 8,81 8,94 8,82 8,93	$4p' \ ^4D^{\circ} - 4d' \ ^2D$ $4p' \ ^4D^{\circ} - 4d' \ ^2D$ $4p' \ ^4D^{\circ} - 4d' \ ^2F$ $4p' \ ^4D^{\circ} - 4d' \ ^2F$ $4p' \ ^4D^{\circ} - 4d' \ ^4D$	3/2 - 3/2 $7/2 - 5/2$ $3/2 - 5/2$ $7/2 - 7/2$ $5/2 - 5/2$
3613,761 3610,809 3609,293 3602,033 3599,133	$\begin{array}{ccc} 9 & 200 \\ 5 & 200 \\ 2 & 1400 \end{array}$	5,39 5,51 1,64 5,39 5,39	8,82 8,94 5,08 8,84 8,84	$4p' \ ^4D^{\circ} - 4d' \ ^4P$ $4p' \ ^4D^{\circ} - 4d' \ ^4F$ $4s^2 \ ^2D - 4p' \ ^4P^{\circ}$ $4p' \ ^4D^{\circ} - 4d' \ ^4D$ $4p' \ ^4D^{\circ} - 4d' \ ^4F$	7/2 - 5/2 $5/2 - 7/2$ $3/2 - 1/2$ $7/2 - 7/2$ $7/2 - 9/2$

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λ, Ă	I	$E_{ m H}^{},\;{ m eV}$	E _B , eV	Transition	J
3598,011 3594,023 3566,131 3546,433 3544,963	10 30 5 15 125	3,82 1,39 3,79 5,57 5,42	7,26 4,84 7,26 9,06 8,92	$4p^{2}P^{\circ}-8s^{2}S$ $4s^{2}D-4p'^{4}P^{\circ}$ $4p^{2}P^{\circ}-8s^{2}S$ $4p'^{4}D^{\circ}-4d'^{4}D$ $4p'^{2}F^{\circ}-4d'^{4}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
3533,746 3530,383 3527,482 3524,231 3520,031	500 2000 500 1250 500	5,42 1,64 5,42 5,42 5,57	8,93 5,15 8,93 8,94 9,09	$4p' \ ^2F^{\circ} - 4d' \ ^2G$ $4s^2 \ ^2D - 4p' \ ^4F^{\circ}$ $4p' \ ^2F^{\circ} - 4d' \ ^4D$ $4p' \ ^2F^{\circ} - 4d' \ ^4F$ $4p' \ ^4D^{\circ} - 4d' \ ^4F$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \end{array} $
3517,039 3512,121 3511,985 3511,835 3507,407	100 650 10 50 5	5,42 5,39 3,82 3,82 5,39	8,94 8,92 7,35 7,35 8,93	$4p' ^2F^{\circ} - 4d' ^2F$ $4p' ^4D^{\circ} - 4d' ^4G$ $4p ^2P^{\circ} - 7d ^2D$ $4p' ^2P^{\circ} - 7d ^2D$ $4p' ^4D^{\circ} - 4d' ^2G$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
3501,529 3501,251 3500,324 3498,938 3498,063	3 5 50 3 125	5,24 5,39 5,52 5,78 5,39	8,78 8,93 9,06 9,32 8,94	$4p' \ ^4F^{\circ} - 4d' \ ^2P$ $4p' \ ^4D^{\circ} - 4d' \ ^4D$ $4p' \ ^4D^{\circ} - 4d' \ ^2D$ $4p' \ ^2D^{\circ} - 6s' \ ^2D$ $4p' \ ^4D^{\circ} - 4d' \ ^4F$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
3488,858 3487,566 3483,761 3481,614 3475,999	100 60 1250 5 750	5,52 5,78 5,51 3,79 5,52	9,07 9,33 9,06 7,35 9,09	$4p' ^4D^{\circ} - 4d' ^4G$ $4p' ^2D^{\circ} - 4d'' ^2P$ $4p' ^4D^{\circ} - 4d' ^4G$ $4p ^2P^{\circ} - 7d ^2D$ $4p' ^4D^{\circ} - 4d' ^4F$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3474,578 3472,141 3471,748 3466,24 3465,401	$5 \\ 200 \\ 2 \\ 25 \\ 50$	5,52 5,51 5,24 5,78 5,78	9,09 9,07 8,81 9,35 9,35	$4p' ^4D^{\circ} - 4d' ^4F$ $4p' ^4D^{\circ} - 4d' ^4G$ $4p' ^4F^{\circ} - 4d' ^2D$ $4p' ^2D^{\circ} - 4d'' ^2D$ $4p' ^2D^{\circ} - 4d'' ^2D$	3/2 - 3/2 $5/2 - 5/2$ $3/2 - 5/2$ $5/2 - 3/2$ $5/2 - 5/2$
3463,499 3459,428 3457,850 3454,686 3450,332	$\begin{array}{c} 5\\ 25\\ 750\\ 200\\ 750\end{array}$	3,82 5,51 1,39 5,78 5,78	7,39 9,09 4,97 9,36 9,37	$4p^{2}P^{\circ}-9s^{2}S$ $4p'^{4}D^{\circ}-4d'^{4}F$ $4s^{2}^{2}D-4p'^{4}P^{\circ}$ $4p'^{2}D^{\circ}-4d''^{2}F$ $4p'^{2}D^{\circ}-4d''^{2}F$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
3447,590 3440,507 3436,543 3433,972 3422,10	3 250 5 3 45	5,72 1,64 5,72 3,79 5,72	9,32 5,24 9,33 7,39 9,35	$4p'\ ^{2}D^{\circ}-6s'\ ^{2}D$ $4s^{2}\ ^{2}D-4p'\ ^{4}F^{\circ}$ $4p'\ ^{2}D^{\circ}-4d''\ ^{2}P$ $4p\ ^{2}P^{\circ}-9s\ ^{2}S$ $4p'\ ^{2}D^{\circ}-4d''\ ^{2}S$	$\begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
3420,166 3415,80 3414,017 3413,343 3413,107	8 200 5 200 10	5,69 5,72 3,82 5,68 5,15	9,31 9,35 7,45 9,31 8,78	$4p' \ ^2P^{\circ} - 4d'' \ ^2P$ $4p' \ ^2D^{\circ} - 4d'' \ ^2D$ $4p \ ^2P^{\circ} - 8d \ ^2D$ $4p' \ ^2P^{\circ} - 4d'' \ ^2P$ $4p' \ ^4F^{\circ} - 4d' \ ^2P$	3/2 - 1/2 $3/2 - 3/2$ $3/2 - 5/2$ $1/2 - 1/2$ $5/2 - 3/2$
3404,66 3403,107 3402,244 3396,324 3395,476	125 5 225 10 60	5,72 5,42 5,69 5,45 5,68	9,36 9,06 9,33 8,80 9,33	$4p' \ ^{2}D^{\circ} - 4d'' \ ^{2}F$ $4p' \ ^{2}F^{\circ} - 4d' \ ^{4}G$ $4p' \ ^{2}P^{\circ} - 4d'' \ ^{2}P$ $4p' \ ^{4}F^{\circ} - 4d' \ ^{4}S$ $4p' \ ^{2}P^{\circ} - 4d'' \ ^{2}P$	3/2 - 5/2 $ 5/2 - 7/2 $ $ 3/2 - 3/2 $ $ 5/2 - 3/2 $ $ 1/2 - 3/2$
3392,016 3388,07 3385,394 3384,80 3381,421	8 8 2 15 200	5,42 5,69 3,79 5,15 5,15	9,07 9,35 7,45 8,81 8,82	$4p' {}^{2}F^{\circ} - 4d' {}^{4}G$ $4p' {}^{2}P^{\circ} - 4d'' {}^{2}S$ $4p {}^{2}P^{\circ} - 8d {}^{2}D$ $4p' {}^{4}F^{\circ} - 4d' {}^{2}D$ $4p' {}^{4}F^{\circ} - 4d' {}^{2}F$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
3381 ,124 3379 ,864 3379 ,653	60 3 5	5,69 5,42 5,24	9,35 9,09 8,91	4p' 2P°—4d" 2D 4p' 2F°—4d' 4F 4p' 4F°—4d' 4P	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{1}{2} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3378,707 3375,6 7 2	2 30	{ 5,39 5,51 5,15	9,06 9,17 8,82	4p' 4D°-4d' 4G 4p' 4D°-6s' 4D 4p' 4F°-4d' 4P	$^{7/2}_{5/2}$ $^{7/2}_{5/2}$ $^{5/2}_{5/2}$
3375,18 3365,342 3362,12 3358,74 3358,27	$750 \\ 2 \\ 2 \\ 2$	5,68 5,10 5,78 5,24 5,52	9,35 8,78 9,46 8,93 9,21	$4p' ^{2}P^{\circ} - 4d'' ^{2}D$ $4p' ^{4}F^{\circ} - 4d' ^{2}G$ $4p' ^{2}D^{\circ} - 6s' ^{2}D$ $4p' ^{4}F^{\circ} - 4d' ^{4}D$ $4p' ^{4}D^{\circ} - 6s' ^{4}D$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
3354,474 3353,466 3349,279 3342,77 3342,454	60 10 450 5 5	5,24 3,82 5,24 5,51 5,08	8,94 7,51 8,94 9,21 8,78	$4p' \ ^4F^{\circ} - 4d' \ ^2D$ $4p \ ^2P^{\circ} - 9d \ ^2D$ $4p' \ ^4F^{\circ} - 4d' \ ^2F$ $4p' \ ^4D^{\circ} - 6s' \ ^4D$ $4p' \ ^4P^{\circ} - 4d' \ ^2P$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3337,845 3335,215 3329,636 3325,812 3325,328	$ \begin{array}{r} 4500 \\ 400 \\ 225 \\ 3 \\ 3 \end{array} $	1,39 5,10 5,10 3,79 5,08	5,10 8,82 8,82 7,51 8,80	$4s^{2} {}^{2}D - 4p' {}^{4}F^{\circ}$ $4p' {}^{4}F^{\circ} - 4d' {}^{2}F$ $4p' {}^{4}F^{\circ} - 4d' {}^{4}P$ $4p {}^{2}P^{\circ} - 9d {}^{2}D$ $4p' {}^{4}P^{\circ} - 4d' {}^{4}S$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3319,682 3317,218 3310,987 3309,558 3307,948	$ \begin{array}{r} 150 \\ 750 \\ 8 \\ 4 \\ 2500 \end{array} $	5,10 5,10 5,57 5,57 5,07	8,84 8,84 9,31 9,32 8,82	$4p' ^4F^{\circ} - 4d' ^4D$ $4p' ^4F^{\circ} - 4d' ^4F$ $4p' ^4D^{\circ} - 4d'' ^2P$ $4p' ^2F^{\circ} - 6s' ^2D$ $4p' ^4F^{\circ} - 4d' ^4G$	7/2 - 7/2 $7/2 - 9/2$ $1/2 - 1/2$ $7/2 - 5/2$ $9/2 - 11/2$
3305,530 3302,787 3294,168 3293,815 3292,965	4 4 5 2 450	5,68 5,42 5,57 5,78 5,07	9,43 9,17 9,33 9,54 8,84	$4p' ^{2}P^{\circ} - 6s' ^{4}D$ $4p' ^{2}F^{\circ} - 6s' ^{4}D$ $4p' ^{4}D^{\circ} - 4d'' ^{2}P$ $4p' ^{2}D^{\circ} - 5d' ^{2}D$ $4p' ^{4}F^{\circ} - 4d' ^{4}D$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 5/_{2} - 7/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 5/_{2} \\ 9/_{2} - 7/_{2} \end{array} $
3292,827 3292,393 3290,541 3286,193 3282,716	$ \begin{array}{r} 650 \\ 425 \\ 4500 \\ \hline 2 \\ 1400 \end{array} $	1,39 5,45 5,07 3,79 5,45	5,15 8,92 8,84 7,56 8,93	$4s^{2} {}^{2}D - 4p' {}^{4}F^{\circ}$ $4p' {}^{4}F^{\circ} - 4d' {}^{4}P$ $4p' {}^{4}F^{\circ} - 4d' {}^{4}F$ $4p {}^{2}P^{\circ} - 10d {}^{2}D$ $4p' {}^{4}F^{\circ} - 4d' {}^{2}G$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 9/2 - 9/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \end{array}$
3279 ,815 3277 ,310 3273 ,957 3268 ,278 3266 ,023	$\begin{array}{c} 2000 \\ 650 \\ 10000 \\ 650 \\ 650 \end{array}$	1,64 5,15 0,00 5,15 5,57	5,42 8,93 3,79 8,94 9,37	$4s^{2} {}^{2}D - 4p' {}^{2}F^{c} \\ 4p' {}^{4}F^{o} - 4cl' {}^{4}D \\ 4s {}^{2}S - 4p {}^{2}P^{c} \\ 4p' {}^{4}F^{o} - 4cl' {}^{2}F \\ 4p' {}^{2}F^{o} - 4d'' {}^{2}F$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
3252,220 3247,540 3243,164 3239,46 3235,713	650 10000 1500 150 650	4,97 0,00 5,10 5,10 5,24	8,78 3,82 8,92 8,93 9,07	$4p' ^4P^{\circ} - 4\ell\ell' ^2P$ $4s ^2S - 4p ^2P^{\circ}$ $4p' ^4F^{\circ} - 4\ell\ell' ^4G$ $4p' ^4F^{\circ} - 4\ell\ell' ^2G$ $4p' ^4F^{\circ} - 4\ell\ell' ^4G$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
3233,899 3231,178 3226,602 3226,541 3225,698	450 650 150 50 5	5,10 5,10 5,08 4,97 5,52	8,93 8,94 8,92 8,81 9,36	4p' 4F°—4d' 4D 4p' 4F°—4d' 4F 4p' 4P°—4d' 4P 4p' 4P°—4d' 2D 4p' 4D°—4d'' 2F	7/2 - 5/2 $7/2 - 7/2$ $1/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$
3225,088 3224,664 3223,435 3221,35 3220,65	2 450 400 8 8	5,10 5,24 5,24 5,51 5,51	8,94 9,09 9,09 9,35 9,35	4p' 4F°—4d' 2F 4p' 4F°—4d' 4F 4p' 4F°—4d' 4F 4p' 4I)°—4d'' 2I) 4p' 4I)°—4d'' 2I)	$ \begin{array}{c} 7/2 - \frac{5}{2} \\ 3/2 - \frac{5}{2} \\ 3/2 - \frac{3}{2} \\ 5/2 - \frac{3}{2} \end{array} $ $ \begin{array}{c} 5/2 - \frac{3}{2} \\ 5/2 - \frac{5}{2} \end{array} $
3218,204 3217,64 3211,43 3209,498 3208,231	5 10 30 4 1400	4,97 5,07 5,51 5,57 1,64	8,82 8,92 9,36 9,43 5,51	$4p' \ ^4P^{\circ} - 4d' \ ^4P$ $4p' \ ^4F^{\circ} - 4d' \ ^4G$ $4p' \ ^4D^{\circ} - 4d'' \ ^2F$ $4p' \ ^4D^{\circ} - 6s' \ ^4D$ $4s^2 \ ^2D - 4p' \ ^4D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 9/2 - 9/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3194,099 3192,22 3179,343 3175,67 3171,663	1500 2 2 60 5	1,64 5,42 5,42 5,42 5,42 5,52	5,52 9,30 9,32 9,32 9,43	$4s^{2} {}^{2}D - 4p' {}^{4}D^{\circ}$ $4p' {}^{2}F^{\circ} - 6s' {}^{4}D$ $4p' {}^{2}F^{\circ} - 6s' {}^{2}D$ $4p' {}^{2}F^{\circ} - 4d'' {}^{2}G$ $4p' {}^{4}D^{\circ} - 6s' {}^{4}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \end{array} $
3169,681 3160,047 3156,629 3151,62 3149,508	500 25 450 8 30	5,15 5,15 1,64 5,42 5,15	9,06 9,07 5,57 9,35 9,09	$4p' {}^{4}F^{\circ} - 4d' {}^{4}G$ $4p' {}^{4}F^{\circ} - 4d' {}^{4}G$ $4s^{2} {}^{2}D - 4p' {}^{4}D^{\circ}$ $4p' {}^{2}F^{\circ} - 4d'' {}^{2}D$ $4p' {}^{4}F^{\circ} - 4d' {}^{4}F$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \end{array}$
3148,57 3148,333 3146,821 3142,797 3142,444	$\begin{array}{c} 2\\ 3\\ 450\\ 8\\ 750 \end{array}$	5,78 5,15 4,97 5,42 4,97	9,71 9,09 8,91 9,36 8,92	$4p' ^{2}D^{\circ} - 6s'' ^{2}D$ $4p' ^{4}F^{\circ} - 4d' ^{4}F$ $4p' ^{4}P^{\circ} - 4d' ^{4}P$ $4p' ^{2}F^{\circ} - 4d'' ^{2}F$ $4p' ^{4}P^{\circ} - 4d' ^{4}P$	5/2-5/2 5/2-3/2 3/2-1 2 5 2-5/2 3/2-3/2
3140,312 3137,72 3131,33 3128,701 3126,109	400 5 5 650 1400	4,84 5,57 5,51 4,97 4,84	8,78 9,52 9,46 8,93 8,80	$4p' ^4P^{\circ} - 4d' ^2P$ $4p' ^2F^{\circ} - 5d' ^2G$ $4p' ^4D^{\circ} - 6s' ^2D$ $4p' ^4P^{\circ} - 4d' ^4D$ $4p' ^4P^{\circ} - 4d' ^4S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3120,435 3118,355 3116,348 3113,482 3108,605	50 5 400 50 2000	4,97 5,39 4,84 4,84 4,84	8,94 9,37 8,81 8,82 8,82	$4p' \cdot ^4P^{\circ} - 4d' \cdot ^2P$ $4p' \cdot ^4D^{\circ} - 4d'' \cdot ^2F$ $4p' \cdot ^4P^{\circ} - 4d' \cdot ^2D$ $4p' \cdot ^4P^{\circ} - 4d' \cdot ^2F$ $4p' \cdot ^4P^{\circ} - 4d' \cdot ^4P$	3/2-1/2 7/2-7/2 5/2-5/2 5/2-7/2 5/2-5/2
3108,452 3099,928 3093,989 3088,132 3086,47	600 1250 1500 125 2	5,08 4,84 1,39 5,08 5,78	9,06 8,84 5,39 9,09 9,79	$4p' ^4P^{\circ} - 4d' ^4D$ $4p' ^4P^{\circ} - 4d' ^4D$ $4s^2 ^2D - 4p' ^4D^{\circ}$ $4p' ^4P^{\circ} - 4d' ^4F$ $4p' ^2D^{\circ} - 5d' ^4G$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3084,96	2	$ \left\{ \begin{array}{l} 5,72 \\ 5,52 \\ 5,78 \end{array} \right. $	$9,74 \\ 9,54 \\ 9,79$	$4p' ^2D^{\circ}$ $-6s'' ^2D$ $4p' ^4D^{\circ}$ $-5d' ^2D$ $4p' ^2D^{\circ}$ $-5d' ^4D$	$\begin{array}{c} 3 & 2 - 3 \\ 3 & 2 - 5 \\ 5 & 2 - 3 \\ 2 & 3 \end{array}$
3073,798 3071,96 3070,97 3068,906	1400 2 5 15	1,39 5,51 5,51 1,64	5,42 9,54 9,54 5,68	$4s^{2} {}^{2}D - 4p' {}^{2}F^{\circ}$ $4p' {}^{4}D^{\circ} - 5d' {}^{2}D$ $4p' {}^{4}D^{\circ} - 5d' {}^{2}F$ $4s^{2} {}^{2}D - 4p' {}^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3066,011 3063,411 3060,84 3057,36 3053,38	3 2500 2 8 10	5,42 1,64 5,51 5,69 5,24	9,46 5,69 9,55 9,74 9,30	$4p' ^{2}F^{\circ} - 6s' ^{2}D$ $4s^{2} ^{2}D - 4p' ^{2}P^{\circ}$ $4p' ^{4}D^{\circ} - 5d' ^{4}D$ $4p' ^{2}P^{\circ} - 6s'' ^{2}D$ $4p' ^{4}F^{\circ} - 6s' ^{4}D$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
3052,554 3051,901 3044,028 3039,488 3036,101	$ \begin{array}{r} 15 \\ 2 \\ 20 \\ 10 \\ 2500 \end{array} $	5,15 5,68 5,10 5,57 1,64	9,21 9,74 9,17 9,65 5,72	$4p' ^4F^{\circ} - 6s' ^4D$ $4p' ^2P^{\circ} - 6s'' ^2D$ $4p' ^4F^{\circ} - 6s' ^4D$ $4p' ^2F^{\circ} - 5d' ^4G$ $4s^2 ^2D - 4p' ^2D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 1 - 3/2 \\ 7/2 - 7/2 \\ 7/2 - 7/2 \\ 3/2 - 3/2 \end{array}$
3034,555 3033,480 3030,258 3029,60 3027,82	3 2 10 2 5	5,72 5,57 4,97 4,84 5,57	9,81 9,66 9,06 8,93 9,66	$4p' ^{2}D^{\circ} - 5d' ^{4}F$ $4p' ^{2}F^{\circ} - 5d' ^{4}F$ $4p' ^{4}P^{\circ} - 4d' ^{4}D$ $4p' ^{4}P^{\circ} - 4d' ^{2}G$ $4p' ^{4}D^{\circ} - 5d' ^{2}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3024,994 3022,608 3021,544 3018,09 3014,848	100 300 300 2 30	{ 3,79 4,84 4,84 5,07 5,69 5,10	7,88 8,93 8,94 9,17 9,79 9,21	$4p^{2}P^{\circ}-5s'^{4}D$ $4p'^{4}P^{\circ}-4d'^{4}D$ $4p'^{4}P^{\circ}-4d'^{4}F$ $4p'^{4}P^{\circ}-6s'^{4}D$ $4p'^{2}P^{\circ}-5d'^{4}D$ $4p'^{4}F^{\circ}-6s'^{4}D$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
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λ, λ	<i>I</i>	E _H , eV	E _B , eV	Transition	J
3013,510 3012,005 3010,838 3008,12 3002,281	2 250 2000 5 10	5,69 4,97 1,39 5,24 5,42	9,80 9,09 5,51 9,36 9,54	4p' 2P°—5d' 4G 4p' 4P°—4d' 4F 4s ² 2D—4p' 4D° 4p' 4F°—4d" 2F 4p' 2F°—5d' 2F	3/2 - 5/2 $3/2 - 5/2$ $5/2 - 5/2$ $3/2 - 5/2$ $3/2 - 5/2$ $5/2 - 7/2$
3001,774 3001,24 2998,384 2997,364 2994,13	2 5 150 2000 5	$5,42 \\ 5,39 \\ 1,39 \\ 1,64 \\ 5,69 \\ 5,52$	9,55 9,52 5,52 5,78 9,83 9,66	$4p' {}^{2}F^{\circ} - 5d' {}^{4}P$ $4p' {}^{4}D^{\circ} - 5d' {}^{2}G$ $4s^{2} {}^{2}D - 4p' {}^{4}D^{\circ}$ $4s^{2} {}^{2}D - 4p' {}^{2}D^{\circ}$ $4p' {}^{2}P^{\circ} - 7s' {}^{2}D$ $4p' {}^{4}D^{\circ} - 5d' {}^{2}D$	$ \begin{array}{c} 5/2 - 5/2 \\ 7/2 - 9/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2991,780 2989,010 2985,926 2984,267 2983,038	45 2 10 5 3	5,52 5,39 5,15 5,51 5,51	9,67 9,54 9,30 9,66 9,66	$4p' ^4D' - 5d' ^2F$ $4p' ^4D' - 5d' ^2F$ $4p' ^4F' - 6s' ^4D$ $4p' ^4D' - 5d' ^4D$ $4p' ^4D' - 5d' ^4F$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
2982,765 2982,123 2979,380 2978,295 2974,675	8 3 25 30 10	5,39 5,57 5,39 5,39 5,45	9,55 9,73 9,55 9,56 9,32	$4p' \ ^4D^\circ - 5d' \ ^4P$ $4p' \ ^2F^\circ - 7s' \ ^4D$ $4p' \ ^4D^\circ - 5d' \ ^4F$ $4p' \ ^4F^\circ - 6s' \ ^2D$	7/2 - 5/2 $7/2 - 5/2$ $7/2 - 7/2$ $7/2 - 9/2$ $5/2 - 5/2$
2961 ,165 2951 ,21 2945 ,23 2939 ,453 2938 ,868	2500 5 3 2 15	$\begin{array}{c} 1,39 \\ 3,82 \\ 5,51 \\ 5,78 \\ 5,15 \\ 5,10 \end{array}$	5,57 8,02 9,71 9,99 9,37 9,32	$4s^{2} 2D - 4p' {}^{2}F^{\circ}$ $4p {}^{2}P^{\circ} - 5s' {}^{2}D$ $4p' {}^{4}D^{\circ} - 6s'' {}^{2}D$ $4p' {}^{2}D^{\circ} - 6d' {}^{4}D$ $4p' {}^{4}F^{\circ} - 4d'' {}^{2}F$ $4p' {}^{4}F^{\circ} - 6s' {}^{2}D$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
2937,766 2933,060 2931,699 2930,416 2926,057	2 20 10 5 10	5,24 4,84 5,08 5,42 5,08	9,46 9,06 9,30 9,65 9,31	4p' 4F°-6s' 2D 4p' 4P°-4d' 4G 4p' 4P°-6s' 4D 4p' 2F°-5d' 4P 4p' 4P°-4d" 2P	3/2 - 3/2 $5/2 - 7/2$ $1/2 - 3/2$ $5/2 - 3/2$ $1/2 - 1/2$
2925,439 2924,882 2923,704 2923,212 2922,830	30 10 80 20 10	5,42 5,42 5,42 4,97 5,57	9,66 9,66 9,66 9,21 9,81	$4p' ^{2}F^{\circ} - 5d' ^{2}G$ $4p' ^{2}F^{\circ} - 5d' ^{4}D$ $4p' ^{2}F^{\circ} - 5d' ^{4}F$ $4p' ^{4}P^{\circ} - 6s' ^{4}D$ $4p' ^{4}D^{\circ} - 5d' ^{4}F$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
2920,296 2912,916 2911,215 2905,662 2891,64	10 2 30 5 30	5,42 5,08 5,39 5,39 5,52	9,67 9,33 9,65 9,66 9,81	\$\langle '2F^\circ -5d'^2F \\ 4p'^4P^\circ -4d''^2P \\ 4p'^4D^\circ -5d'^4F \\ 4p'^4D^\circ -5d'^4F \\ 4p'^4D^\circ -5d'^4F \\	$ \begin{array}{c} 5/2 - 5/2 \\ 1/2 - 3/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
2890,84 2885,408 2882,934 2879,743 2878,86	50 5 1500 2 5	$\begin{array}{c} 5,51 \\ 5,51 \\ 5,24 \\ 1,39 \\ 5,78 \\ 3,79 \\ 5,57 \end{array}$	9,79 9,80 9,54 5,69 10,08 8,09 9,87	$4p' ^4D^{\circ} - 5d' ^4G$ $4p' ^4D^{\circ} - 5d' ^4G$ $4p' ^4F^{\circ} - 5d' ^2D$ $4s^2 ^2D - 4p' ^2P^{\circ}$ $4p' ^2D^{\circ} - 5d'' ^2D$ $4p ^2P^{\circ} - 5s' ^2D$ $4p' ^4D^{\circ} - 6d' ^4S$	$ \begin{array}{c} 5/_{2} 7/_{2} \\ 5/_{2} - 5/_{2} \\ 3/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \\ 5/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array} $
2877,401 2876,025 2875,67 2875,240 2874,560	5 2 10 2 20	5,39 5,42 5,78 5,15 5,78	9,70 9,73 10,09 9,46 10,09	$4p' ^4D^{\circ} - 7s' ^4D$ $4p' ^2F^{\circ} - 7s' ^4D$ $4p' ^2D^{\circ} - 5d'' ^2F$ $4p' ^4F^{\circ} - 6s' ^2D$ $4p' ^2D^{\circ} - 5d'' ^2F$	7/2 $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$ $5/2$
2869,80 2868,470	2 10	5,39 $ 5,42 $ $ 5,51$	9,71 9,74 9,83	$\frac{4p'}{4p'}\frac{4D}{6s''}\frac{2D}{2D}$ $\frac{4p'}{4p'}\frac{4D}{6s''}\frac{2D}{4D}$	$\begin{array}{c} 7/_2 - 5/_2 \\ 5/_2 - 3/_2 \\ 5/_2 - 3/_2 \end{array}$

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
2862,07	5	4,97	9,30	$4p' ^4P^{\circ} - 6s' ^4D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2858,734	200	1,39	5,72	$4s^2 ^2D - 4p' ^2D^{\circ}$	
2858,225	50	4,84	9,17	$4p' ^4P^{\circ} - 6s' ^4D$	
2856,660	2	4,97	9,33	$4p' \ ^4P^{\circ} - 4d'' \ ^2P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
2851,743	15	4,97	9,32	$4p' \ ^4P^{\circ} - 6s' \ ^2D$	
2846,478	15	5,08	9,43	$4p' \ ^4P^{\circ} - 6s' \ ^4D$	
2844,842	10	5,72	10,08	$4p' \ ^2D^{\circ} - 5d'' \ ^2D$	
2844,160	15	4,97	9,33	$4p' \ ^4P^{\circ} - 4d'' \ ^2P$	
2840,92 2834,30 2832,49 2830,93 2829,42	10 2 5 3 5	5,72 4,97 4,84 — 4,97	10,09 9,35 9,21 — 9,35	$4p' \ ^{2}D^{\circ} - 5d'' \ ^{2}F$ $4p' \ ^{4}P^{\circ} - 4d'' \ ^{2}S$ $4p' \ ^{4}P^{\circ} - 6s' \ ^{4}D$ $ 4p' \ ^{4}P^{\circ} - 4d'' \ ^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ - \\ 3/2 - 5/2 \end{array} $
2824,370 2818,68 2813,558	1250 4 2	1,39 5,15 5,42 5,42	5,78 9,55 9,83 9,83	$4s^{2} {}^{2}D - 4p' {}^{2}D^{\circ}$ $4p' {}^{4}F^{\circ} - 5d' {}^{4}P$ $4p' {}^{2}F^{\circ} - 7s' {}^{4}D$ $4p' {}^{2}F^{\circ} - 7s' {}^{2}D$	$ \frac{5}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{5}{2} $
2812,74 2805,71	2 5	$ \begin{cases} 5,57 \\ 5,57 \\ 5,24 \end{cases} $	9,83 9,98 9,66	$4p' \ ^2F^\circ - 7s' \ ^2D$ $4p' \ ^2F^\circ - 6d' \ ^4G$ $4p' \ ^4F^\circ - 5d' \ ^2D$	$\begin{array}{c} 7/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \end{array}$
2803,686	10	5,24	9,67	$4p' ^4F^{\circ} - 5d' ^2F$	$ \begin{array}{c} 3/2 - 5/2 \\ 7/2 - 9/2 \\ 3/2 - 1/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
2802,556	10	5,40	9,52	$4p' ^4F^{\circ} - 5d' ^2G$	
2793,485	2	5,52	9,96	$4p' ^4D^{\circ} - 7s' ^4D$	
2791,951	5	5,40	9,54	$4p' ^4F^{\circ} - 5d' ^2F$	
2786,496	10	5,10	9,55	$4p' ^4F^{\circ} - 5d' ^4P$	
2783,551	20	5,40	9,55	$4p' {}^{4}F^{\circ} - 5d' {}^{4}D$	7/2 $7/2$ $7/2$ $7/2$ $9/2$ $9/2$ $11/2$ $3/2$ $3/2$ $3/2$ $1/2$
2782,592	20	5,40	9,56	$4p' {}^{4}F^{\circ} - 5d' {}^{4}F$	
2768,878	125	5,07	9,55	$4p' {}^{4}F^{\circ} - 5d' {}^{4}G$	
2766,371	2500	1,64	6,12	$4s^{2} {}^{2}D - 5d {}^{2}P^{\circ}$	
2764,762	5	5,07	9,55	$4p' {}^{4}F^{\circ} - 5d' {}^{4}D$	
2763 ,809	15	5,07	9,56	$4p' ^4F^{\circ} - 5d' ^4F$	$ \begin{array}{c} 9/2 - 9/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
2760 ,25	2	4,97	9,46	$4p' ^4P^{\circ} - 6s' ^2D$	
2755 ,69	5	5,15	9,65	$4p' ^4F^{\circ} - 5d' ^4P$	
2751 ,810	10	5,57	10,08	$4p' ^2F^{\circ} - 5d'' ^2D$	
2751 ,29	10	5,15	9,66	$4p' ^4F^{\circ} - 5d' ^2G$	
2750 ,786	5	5,45	9,66	$4p' {}^{4}F^{\circ} - 5d' {}^{4}D$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 7/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
2749 ,734	2	5,15	9,66	$4p' {}^{4}F^{\circ} - 5d' {}^{4}F$	
2746 ,713	20	5,15	9,67	$4p' {}^{4}F^{\circ} - 5d' {}^{2}F$	
2745 ,452	20	5,57	10,09	$4p' {}^{2}F^{\circ} - 5d'' {}^{2}F$	
2737 ,608	2	4,84	9,36	$4p' {}^{4}P^{\circ} - 4d'' {}^{2}F$	
2734,858	10	4,84	9,37	$4p' ^4P^{\circ} - 4d'' ^2F$	$ \begin{array}{c} 5/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
2723,953	30	5,10	9,65	$4p' ^4F^{\circ} - 5d' ^4G$	
2722,702	5	4,97	9,53	$4p' ^4P^{\circ} - 5d' ^2P$	
2720,62	2	5,10	9,66	$4p' ^4F^{\circ} - 5d' ^2G$	
2720,199	15	5,24	9,80	$4p' ^4F^{\circ} - 5d' ^4G$	
2719,097	15	5,10	9,66	$4p' \ ^4F^{\circ} - 5d' \ ^4F$	7/2 - 7/2 $3/2 - 3/2$ $3/2 - 5/2$ $3/2 - 3/2$ $5/2 - 7/2$
2718,847	2	5,52	10,08	$4p' \ ^4D^{\circ} - 5d'' \ ^2D$	
2715,543	20	5,24	9,81	$4p' \ ^4F^{\circ} - 5d' \ ^4F$	
2715,35	5	5,24	9,81	$4p' \ ^4F^{\circ} - 5d' \ ^4F$	
2714,54	2	5,42	9,99	$4p' \ ^2F^{\circ} - 6d' \ ^2G$	
2714,00 2705,18 2702,65 2694,080 2676,428	2 2 10 5 20	4,97 5,24 5,07 5,08 5,10 5,07	9,54 9,83 9,66 9,66 9,70 9,70	$4p' ^4P^{\circ} - 5d' ^2D$ $4p' ^4F^{\circ} - 7s' ^4D$ $4p' ^4F^{\circ} - 5d' ^2G$ $4p' ^4P^{\circ} - 5d' ^2D$ $4p' ^4F^{\circ} - 7s' ^4D$ $4p' ^4F^{\circ} - 7s' ^4D$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{9}{2} - \frac{7}{2} $ $ \frac{1}{2} - \frac{3}{2} $ $ \frac{7}{2} - \frac{7}{2} $
2672,05 2671,204 502	5 20	5,07	9,70	$4p^{-4}F^{\circ} - 7s^{-4}D$ $-5d^{-4}G$	$\frac{9}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2666,59 2652,065 2651,693	2 2 10	5,15 5,15 4,97	9,80 9,83 9,65	4p' 4F°—5d' 4G 4p' 4F°—7s' 4D 4p' 4P°—5d' 4P	$\begin{array}{c} 5/_2-5/_2 \\ 5/_2-3/_2 \\ 3/_2-1/_2 \end{array}$
2649,840 2645,303 2641,550 2634,933 2630,004	30 20 5 30 20	4,97 4,97 4,97 4,84 4,84	9,65 9,66 9,67 9,54 9,55	$4p' ^4P^{\circ} - 5d' ^4P$ $4p' ^4P^{\circ} - 5d' ^4D$ $4p' ^4P^{\circ} - 5d' ^2F$ $4p' ^4P^{\circ} - 5d' ^4S$ $4p' ^4P^{\circ} - 5d' ^4P$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2627,365 2626,678 2622,875 2618,366 2605,26	20 10 5 2500 3	4,84 5,08 5,10 1,39 4,97	9,55 9,79 9,83 6,12 9,73	$4p' ^4P^{\circ} - 5d' ^4D$ $4p' ^4P^{\circ} - 5d' ^4D$ $4p' ^4F^{\circ} - 7s' ^2D$ $4s^2 ^2D - 5p ^2P^{\circ}$ $4p' ^4P^{\circ} - 7s' ^4D$	$\begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
2593,65 2592,627 2580,57 2579,29 2577,12	$\begin{array}{c} 2\\200\\5\\20\\2\end{array}$	5,10 1,39 5,07 5,07	9,88 6,19 9,88 9,88	$4p' ^4F^{\circ} - 6d' ^4F$ $ 4s^2 ^2D - 4d ^2D$ $4p' ^4F^{\circ} - 6d' ^4G$ $4p' ^4F^{\circ} - 6d' ^4F$	$^{7/2}_{-}^{-}^{9/2}_{-}$ $^{5/2}_{-}^{-}^{5/2}_{-}^{9/2}_{-}^{-}^{11/2}_{-}^{9/2}_{-}^{-}^{9/2}$
2570,800 2569,888 2567,330 2563,955 2563,553	10 10 2 3 3	4,84 4,84 4,97 5,15 5,15	9,66 9,66 9,80 9,99 9,99	$4p' ^4P^{\circ} - 5d' ^4D$ $4p' ^4P^{\circ} - 5d' ^4F$ $4p' ^4P^{\circ} - 5d' ^4G$ $4p' ^4F^{\circ} - 6d' ^2G$ $4p' ^4F^{\circ} - 6d' ^4F$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 7/2 \end{array} $
2563,167 2553,29 2547,48 2540,38 2536,86	$10 \\ 2 \\ 10 \\ 5 \\ 2$	4,97 4,97 4,84 5,10 5,10	9,81 9,83 9,70 9,98 9,99	$4p' ^4P^{\circ} - 5d' ^4F$ $4p' ^4P^{\circ} - 7s' ^2D$ $4p' ^4P^{\circ} - 7s' ^4D$ $4p' ^4F^{\circ} - 6d' ^4G$ $4p' ^4F^{\circ} - 6d' ^4F$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \end{array} $
2536,67 2536,03 2494,89 2492,146 2479,754	$\begin{array}{c} 2\\2\\10\\2000\\10\end{array}$	5,07 5,10 3,82 0,00 3,82	9,96 9,99 8,78 4,97 8,81	$4p' ^4F^{\circ} - 8s' ^4D$ $4p' ^4F^{\circ} - 6d' ^2F$ $4p ^2P^{\circ} - 4d' ^2P$ $4s ^2S - 4p' ^4P^{\circ}$ $4p ^2P^{\circ} - 4d' ^2D$	9/2 - 7/2 $7/2 - 5/2$ $3/2 - 3/2$ $1/2 - 3/2$ $3/2 - 5/2$
2474,818 2460,93 2458,88 2457,74 2441,637	5 5 5 1000	3,82 4,84 4,84 4,84 0,00	8,82 9,87 9,88 9,88 5,08	$4p^{2}P^{\circ}-4d'^{4}P$ $4p'^{4}P^{\circ}-6d'^{4}S$ $4p'^{4}P^{\circ}-6d'^{4}P$ $4p'^{4}P^{\circ}-6d'^{4}D$ $4s^{2}S-4p'^{4}P^{\circ}$	3/2 - 5/2 $5/2 - 3/2$ $5/2 - 5/2$ $5/2 - 7/2$ $1/2 - 1/2$
2416,605 2415,197 2406,665 2404,864 2392,627	55500 2500	3,82 3,79 1,64 3,79 1,64	8,94 8,92 6,79 8,94 6,82	$4p^{2}P^{\circ}-4d'^{2}P$ $4p^{2}P^{\circ}-4d'^{4}P$ $4s^{2}D-6p^{2}P^{\circ}$ $4p^{2}P^{\circ}-4d'^{2}D$ $4s^{2}D-6p^{2}P^{\circ}$	3/2 - 1/2 $1/2 - 3/2$ $3/2 - 3/2$ $1/2 - 3/2$ $1/2 - 3/2$ $3/2 - 1/2$
2363 ,220 2348 ,352 2319 ,561 2303 ,116 2293 ,842	5 2 500 1000 2500	0,00 3,79 1,64 1,64 1,39	5,24 9,06 6,98 7,02 6,79	$4s^2S-4p'^4F^\circ \ 4p^2P^\circ-4d'^4D \ 4s^2^2D-4p''^2P^\circ \ 4s^2^2D-4p''^2D^\circ \ 4s^2^2D-6p^2P^\circ$	$^{1}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-5}/_{2}$ $^{5}/_{2}$ $^{-3}/_{2}$
2263 ,079 2260 ,528 2247 ,503 2244 ,265 2238 ,454	2200 1300 2 2300 1100	1,64 1,39 3,82 0,00 1,64	7,12 6,87 9,33 5,52 7,18	$4s^2 {}^2D - 7p {}^2P^{\circ} \ 4s^2 {}^2D - 4f {}^2F^{\circ} \ 4p {}^2P^{\circ} - 4d'' {}^2P \ 4s {}^2S - 4p' {}^4D^{\circ} \ 4s^2 {}^2D - 5f {}^2F^{\circ}$	$\begin{array}{c} 3/2 - 1/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
2237,34 2236,278 2230,084 2227,775 2225,697	5 900 2500 1600 2100	1,64 1,39 1,64 0,00	7,18 6,95 7,21 5,57	$-4s^2$ 2D $-7p$ 2P 0 $^4s^2$ 2D $-4p''$ 2F 0 $^4s^2$ 2D $-4p''$ 2F 0 4s 2S $-4p'$ 4D 0	$ \begin{array}{c}$

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
2215,654 2214,581 2205,65	1000 1600 5	1,64 1,39	7,24 6,98	4s ² ² D—4p" ² P° 4s ² ² D—4p" ² P°	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2199,752 2199,583	1300 1700	1,64 1,39	$^{7,28}_{7,02}$	4s ² ² D—4p" ² D° 4s ² ² D—4p" ² D°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2181,720 2178,944 2171,817 2169,562 2165,093	1700 1600 200 300 1300	0,00 0,00 1,64 1,64 0,00	5,68 5,69 7,35 7,35 5,72	$4s^{2}S - 4p'^{2}P^{\circ}$ $4s^{2}S - 4p'^{2}P^{\circ}$ $4s^{2}D - 8p^{2}P^{\circ}$ $4s^{2}D - 8p^{2}P^{\circ}$ $4s^{2}S - 4p'^{2}D^{\circ}$	1/2 - 1/2 $1/2 - 3/2$ $3/2 - 3/2$ $3/2 - 1/2$ $1/2 - 3/2$
2149,40 2142,72	10 5		 		<u> </u>
2140,56 2138,533 2130,762	2 500 50	1,39 1,39 1,39	7,18 7,18 7,21	4s ² ² D-5f ² F° 4s ² ² D-7p ² P° 4s ² ² D-4p" ² F°	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2124,35 2113,26 2105,112 2079,529 2068,321	$\begin{array}{c} 5 \\ 2 \\ 800 \\ 20 \\ 5 \end{array}$	3,82 3,79 1,39 1,39 3,82	9,65 9,65 7,28 7,35 9,81	$4p^{2}P^{\circ}-5d'^{4}P$ $4p^{2}P^{\circ}-5d'^{4}P$ $4s^{2}^{2}D-4p''^{2}D^{\circ}$ $4s^{2}^{2}D-8p^{2}P^{\circ}$ $4p^{2}P^{\circ}-5d'^{4}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2045,62 2024,335 1825,348	5 200 100	1,39 0,00 0,00	$7,45 \\ 6,12 \\ 6,79$	4s ² 2D — 9p 2P° 4s 2S — 5p 2P° 4s 2S — 6p 2P°	$^{5/2}_{1/2}$ $^{3/2}_{2}$ $^{1/2}_{2}$ $^{3/2}_{2}$, $^{1/2}_{2}$
1817,334 1817,265 1774,820	$ \begin{array}{c} 20 \\ 200 \end{array}$	$00,00 \\ 00,0$	$6,82 \\ 6,98$	4s ² S—6p ² P° 4s ² S—4p″ ² P°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
1764,540 1749,202 1741,574 1732,674 1731,32	$ \begin{array}{r} 40 \\ 2 \\ 50 \\ 20 \\ 2 \end{array} $	0,00 1,64 0,00 1,64 1,64	7,03 8,73 7,12 8,80 8,80	$4s^{2}S-7s^{2}S$ $4s^{2}^{2}D-5p'^{4}F^{\circ}$ $4s^{2}S-7p^{2}P^{\circ}$ $4s^{2}^{2}D-5p'^{2}F^{\circ}$ $4s^{2}^{2}D-5p'^{4}P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
1730,576 1725,664 1713,364 1709,396 1707,391	10 50 50 2 5	1,64 0,00 0,00 1,64 0,00	8,81 7,18 7,24 8,89 7,26	$4s^2 \ ^2D - 5p' \ ^4D^\circ$ $4s \ ^2S - 7p \ ^2P^\circ$ $4s \ ^2S - 4p'' \ ^2P^\circ$ $4s^2 \ ^2D - 5p' \ ^2D^\circ$ $4s \ ^2S - 8s \ ^2S$	3/2 - 3/2 $1/2 - 3/2$ $1/2 - 1/2$ $3/2 - 5/2$ $1/2 - 1/2$
1703,843 1701,292 1692,654 1691,076 1688,865	30 10 5 30 15	0,00 1,64 1,39 1,39 1,39	7,28 8,93 8,71 8,72 8,73	$4s^{2}S-4p''^{2}D^{\circ}$ $4s^{2}D-5p'^{2}D^{\circ}$ $4s^{2}D-5p'^{4}P^{\circ}$ $4s^{2}D-5p'^{4}F^{\circ}$ $4s^{2}D-5p'^{4}F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \end{array} $
1688,093 1687,043 1685,682 1684,674 1673,440 1671,484	$\begin{array}{c} 30 \\ 20 \\ 25 \\ 20 \\ 5 \\ 3 \end{array}$	1,39 0,00 0,00 1,39 1,39 1,39	8,73 7,35 7,35 8,75 8,80 8,81	$4s^2 {}^2D - 5p' {}^4D^\circ \ 4s {}^2S - 8p {}^2P^\circ \ 4s {}^2S - 8p {}^2P^\circ \ 4s^2 {}^2D - 5p' {}^4D^\circ \ 4s^2 {}^2D - 5p' {}^2F^\circ \ 4s^2 {}^2D - 5p' {}^4D^\circ \ $	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
1664,708 1664,303 1655,318 1651,721	10 10 30 20	0,00 0,00 1,39 1,39	7,45 7,45 8,88 8,89	$4s^{2}S - 9p^{2}P^{\circ}$ $4s^{2}S - 9p^{2}P^{\circ}$ $4s^{2}D - 5p'^{2}F^{\circ}$ $4s^{2}D - 5p'^{2}D^{\circ}$	1/2 - 3/2 $1/2 - 1/2$ $5/2 - 7/2$ $5/2 - 5/2$
1650,301 1650,119 1640,474 1632,326 1621,316	5 5 5 5 20	0,00 0,00 0,00 1,64 1,64	7,51 7,51 7,56 9,24 9,29	$4s^2S - 10p^2P^\circ$ $4s^2S - 10p^2P^\circ$ $4s^2S - 11p^2P^\circ$ $4s^2^2D - 5p''^2D^\circ$ $4s^2^2D - 5p''^2F^\circ$	$\begin{array}{c} {}^{1/2} - {}^{3/2} \\ {}^{1/2} - {}^{1/2} \\ {}^{1/2} - {}^{3/2}, \ {}^{1/2} \\ {}^{3/2} - {}^{5/2}, \ {}^{3/2} \\ {}^{3/2} - {}^{5/2} \end{array}$
1616,940 1585,871 1583,799 1579,658	20 5 15 5	1,64 1,39 1,39 1,39	9,31 9,21 9,22 9,24	$4s^{2} {}^{2}D - 5p'' {}^{2}P^{\circ}$ $4s^{2} {}^{2}D - 5p'' {}^{2}P^{\circ}$ $4s^{2} {}^{2}D - 5p'' {}^{2}F^{\circ}$ $4s^{2} {}^{2}D - 5p'' {}^{2}D^{\circ}$	$ \begin{array}{c} 7/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2, 3/2 \end{array} $
504					

Cu II, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 1S_0$ Ionization potential $163 665,6 \text{ cm}^{-1}$; 20,291 eV

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		_				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	λ, Å	I	E_{H} , eV	EB, eV	Transition	J
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10162,88 10080,47 10055,02	$\begin{array}{c} 1\\10\\30\end{array}$	16,89 17,14 16,88	18,41 18,37 18,11	4f 3G° 5g 3G 4f 3G° 5g 3H 4f 3G° 5g 3H	4-4 3-4 5-6
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	10038,19 10036,32 10026,93	15 5 t	17,14 16,88 16,88	18,37 18,11 18,11	$4f {}^{1}G^{\circ} - 5g {}^{1}H$ $4f {}^{3}F^{\circ} - 5g {}^{3}F$ $4f {}^{3}F^{\circ} - 5g {}^{3}H$	4-5 4-4 4-5
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9994,32 9960,46 9960,07	$15 \\ 10$	17,13 17,13 15,32 16,87 16,86	18,37 18,37 16,56 18,11 18,11	$4f ^1F^{\circ} - 5g ^1F$ $4f ^1F^{\circ} - 5g ^1G$ $5p ^1D^{\circ} - 6s ^3D$ $4f ^3F^{\circ} - 5g ^1D$ $4f ^3D^{\circ} - 5g ^1D$	3-3 3-4 2-3 3-2 2-2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9925,67 9918,05 9916,52 9915,20	$ \begin{array}{r} 20 \\ 15 \\ 30 \\ 1 \end{array} $	16,87 17,12 16,86 17,12 16,86	18,11 18,37 18,11 18,37 18,11	4f ³ F°-5g ³ G 4f ³ H°-5g ³ I 4f ³ D°-5g ³ F 4f ¹ H°-5g ¹ I 4f ³ D°-5g ³ D	3-4 4-5 2-3 5-6 3-3
9868, 20	9894,44 9893,04 9884,09	5 10	$ \begin{array}{c} 16,86 \\ 17,11 \\ 17,12 \\ 16,86 \\ 47,12 \end{array} $	18,11 18,37 48,37 18,11 18,37	$4f ^3D ^\circ - 5g ^3F$ $4f ^3D ^\circ - 5g ^3F$ $4f ^3H ^\circ - 5g ^3H$ $4f ^1P ^\circ - 5g ^1D$ $4f ^1H ^\circ - 5g ^1H$	3-4 $1-2$ $4-4$ $1-2$ $5-5$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9868,20 9864,26 9861,41 9858,87 9850,58	15 40 50 3 3	17,11 16,85 16,85 16,85 16,85	18,37 18,11 18,11 18,11	$4f^{1}D^{\circ} - 5g^{1}F$ $4f^{3}H^{\circ} - 5g^{3}I$ $4f^{3}H^{\circ} - 5g^{3}I$ $4f^{3}P^{\circ} - 5g^{3}I$ $4f^{3}P^{\circ} - 5g^{3}I$	2-3 5-6 6-7 2-2 0-1
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9830,90 9829,06 9828,06 9813,35	5 3 5 20	16,85 $15,32$ $16,85$ $16,84$	18,11 16,58 18,11 18,11	$4f ^3H^{\circ} - 5g ^3H$ $5p ^1D^{\circ} - 6s ^3D$ $4f ^3H^{\circ} - 5g ^3H$ $4f ^3P^{\circ} - 5g ^3D$	5-5 $ 2-2 $ $ 6-6 $ $ 1-2$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9732,28 9688,71 9512,43 9473,36	$\begin{array}{c} 3\\10\\2\\1\end{array}$	16,84 13,68 13,68 13,68	18,11 14,96 14,99 14,99	$4p' \ ^{3}G^{\circ} - 5g \ ^{3}G$ $5s \ ^{1}D - 5p \ ^{3}F^{\circ}$ $5s \ ^{1}D - 4p'' \ ^{1}D^{\circ}$ $5s \ ^{1}D - 5p \ ^{3}P^{\circ}$	$ \begin{array}{r} 4 - 4 \\ 2 - 3 \\ 2 - 2 \\ 2 - 1 \end{array} $
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	9451,59 9332,04 9226,86 9205,40	$\frac{2}{5}$ 1 20	15,25 13,68 13,65 15,23	16,56 15,01 14,99 16,58	$5p^{1}F^{\circ}-6s^{3}D$ $5s^{1}D-4p''^{1}F^{\circ}$ $5s^{3}D-5p^{3}P^{\circ}$ $5p^{1}P^{\circ}-6s^{3}D$ $5p^{3}F^{\circ}-6s^{3}D$	2-3 1-4 1-2 2-2
	8609,26 8606,64 8511,04 8503,46 8477,26	3 40 45 10	15,12 13,68 15,12 13,43 9,12	16,56 15,12 16,58 14,89 10,59	$5s ^{1}D - 5p ^{3}D^{\circ}$ $5p ^{3}D^{\circ} - 6s ^{3}D$ $5s ^{3}D - 5p ^{3}P^{\circ}$ $4p ^{1}P^{\circ} - 4s^{2} ^{1}D$	$ \begin{array}{r} 2-2 \\ 2-2 \\ 2-2 \\ 1-2 \end{array} $

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
8277,60	50	13,39	14,89	5s ³ D-5p ³ P°	3-2
8256,90	5	15,32	16,82	5p ¹ D°-6s ³ D	2-1
8235,30	10	13,65	15,15	5s ³ D-5p ³ P°	1-0
8192,28 8095,55 8088,58 8075,46 8026,45	30 40 20 2 10	{ 15,07 15,32 13,43 15,29 13,68 15,29	16,58 16,83 14,96 16,82 15,22 16,83	$5p ^3D^{\circ} - 6s ^3D$ $5p ^1D^{\circ} - 6s ^1D$ $5s ^3D - 5p ^3F^{\circ}$ $5p ^3D^{\circ} - 6s ^3D$ $5s ^1D - 5p ^3F^{\circ}$ $5p ^3D^{\circ} - 6s ^1D$	3-2 $ 2-2 $ $ 2-3 $ $ 1-1 $ $ 2-2 $ $ 1-2$
7996 ,72 7988 ,17 7972 ,01 7944 ,42 7902 ,57	10 60 8 25 25	13,68 15,01 13,43 13,43 13,68	15,23 16,56 14,99 14,99 15,25	$\begin{array}{c} 5s ^{1}D - 5p ^{1}P ^{\circ} \\ 4p ^{''} ^{1}F ^{\circ} - 6s ^{3}D \\ 5s ^{3}D - 4p ^{''} ^{1}D ^{\circ} \\ 5s ^{3}D - 5p ^{3}P ^{\circ} \\ 5s ^{1}D - 5p ^{1}F ^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 3-3 \\ 2-2 \\ 2-1 \\ 2-3 \end{array} $
7895,83 7890,56 7860,58 7845,03 7825,66	20 3 5 25 50	$13,65 \\ 13,39 \\ 14,99 \\ 13,43 \\ 15,25 \\ 13,39$	15,22 14,96 16,56 15,01 16,83 14,98	$5s ^3D - 5p ^3F^{\circ}$ $5s ^3D - 5p ^3F^{\circ}$ $4p'' ^1D^{\circ} - 6s ^3D$ $5s ^3D - 4p'' ^1F^{\circ}$ $5p ^1F^{\circ} - 6s ^1D$ $5s ^3D - 5p ^3F^{\circ}$	1-2 3-3 2-3 2-3 3-2 3-4
7820,57	5	13,65	15,23	$\begin{array}{c} 5s ^{3}D - 5p ^{1}P^{\circ} \\ 5p ^{1}P^{\circ} - 6s ^{3}D \\ 5p ^{3}F^{\circ} - 6s ^{3}D \\ 5p ^{3}P^{\circ} - 6s ^{3}D \\ 4p '' ^{1}D^{\circ} - 6s ^{3}D \end{array}$	1-1
7812,33	10	15,23	16,82		1-1
7807,66	75	14,98	16,56		4-3
7805,19	25	14,99	16,58		1-2
7778,74	30	14,99	16,58		2-2
7754,37	10	15,23	16,83	$5p ^{1}P^{\circ} - 6s ^{1}D$ $5p ^{3}F^{\circ} - 6s ^{3}D$ $5p ^{3}F^{\circ} - 6s ^{3}D$ $5s ^{1}D - 5p ^{3}D^{\circ}$ $5p ^{3}F^{\circ} - 6s ^{3}D$	1-2
7744,09	5	14,96	16,56		3-3
7738,68	30	15,22	16,82		2-1
7726,64	5	13,68	15,29		2-1
7664,70	75	14,96	16,58		3-2
7652,36	30	13,39	15,01	$\begin{array}{c} 5s ^3D - 4p'' ^1F^{\circ} \\ 5s ^3D - 5p ^3D^{\circ} \\ 5s ^1D - 5p ^1D^{\circ} \\ 5s ^3D - 5p ^3D^{\circ} \\ 5p ^3P^{\circ} - 6s ^3D \end{array}$	3-3
7579,87	10	13,43	15,07		2-3
7579,02	30	13,68	15,32		2-2
7562,01	25	13,65	15,29		1-1
7438,15	15	15,15	16,82		0-1
7433,85 7420,70 7404,34 7399,89 7382,18	5 8 100 20 10	15,48 13,65 14,89 13,39 15,18	16,84 15,32 16,56 15,07 16,86	$4d\ ^{1}S-4f\ ^{3}P^{\circ}\ 5s\ ^{3}D-5p\ ^{1}D^{\circ}\ 5p\ ^{3}P^{\circ}-6s\ ^{3}D\ 5s\ ^{3}D-5p\ ^{3}D^{\circ}\ 4d\ ^{1}S-4f\ ^{1}P^{\circ}$	0-1 $1-2$ $2-3$ $3-3$ $0-1$
7331,74	15	14,89	16,58	$5p ^{3}P^{\circ} - 6s ^{3}D$	$ \begin{array}{r} 2-2 \\ 2-2 \\ 2-1 \\ 2-2 \\ 2-2 \end{array} $
7326,02	15	13,43	15,12	$5s ^{3}D - 5p ^{3}D^{\circ}$	
7306,60	12	15,12	16,82	$5p ^{3}D^{\circ} - 6s ^{3}D$	
7255,83	20	15,12	16,83	$5p ^{3}D^{\circ} - 6s ^{1}D$	
7194,92	15	8,86	10,59	$4p ^{3}D^{\circ} - 4s^{2} ^{1}D$	
7022,75	2	15,07	16,83	$5p \ ^{3}D^{\circ} - 6s \ ^{1}D$ $4p \ ^{3}D^{\circ} - 4s^{2} \ ^{1}D$ $5d \ ^{3}G - 6f \ ^{3}H^{\circ}$ $4p'' \ ^{1}F^{\circ} - 6s \ ^{1}D$ $4p'' \ ^{3}F^{\circ} - 6s \ ^{3}D$	3-2
6872,43	3	8,78	10,59		3-2
6823,40	3	16,95	18,77		5-6
6809,90	4	15,01	16,83		3-2
6806,60	4	14,76	16,58		2-2
6780,40	3	14,99	16,82	$5p ^{3}P^{\circ} - 6s ^{3}D$	$egin{array}{c} 1-1 \\ 1-2 \\ 2-1 \\ 1-2 \\ 2-2 \\ \end{array}$
6770,70	8	9,12	10,95	$4p ^{1}P^{\circ} - 4s^{2} ^{3}P$	
6758,55	8	15,12	16,96	$5p ^{3}D^{\circ} - 5d ^{3}P$	
6737,64	5	14,99	16,83	$5p ^{3}P^{\circ} - 6s ^{1}D$	
6660,99	8	9,09	10,95	$4p ^{1}D^{\circ} - 4s^{2} ^{3}P$	
6649,22 6641,41 6631,85	$\begin{array}{c} 2\\10\\2\end{array}$	15,32 15,12 14,96	17,18 16,99 16,83	$5p ^{1}D^{\circ} - 5d ^{1}P$ $5p ^{3}D^{\circ} - 5d ^{3}F$ $5p ^{3}F^{\circ} - 6s ^{1}D$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 3-2 \end{array} $

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
6624,29 6564,50	8 10	15,12 15,07	16,99 16,95	5p ³ D°-5d ³ D 5p ³ D°-5d ³ P	$\begin{array}{c} 2-2 \\ 3-2 \end{array}$
6555,05 6551,58 6541,93	$\begin{array}{c} 5 \\ 2 \\ 2 \end{array}$	9,09 9,06 14,34	10,99 10,95 16,23	4p ¹ D°—4s ² ³ P 4p ³ D°—4s ² ³ P 4d ³ P—4p ^{IV5} D°	2—1 1—2 1—2, 1
6530 ,30 6521 ,14	8 14	$14,34 \\ 9,12$	16,23 11,02	$4d\ ^3P-4p^{\mathrm{IV}5}D^{\circ} \ 4p\ ^1P^{\circ}-4s^2\ ^3P$	2—2, 1 1—0
6494,04 6484,46 6481,46 6470,152 6466,60	30 20 15 50 3	15,07 14,99 15,32 14,65 14,99	16,97 16,90 17,23 16,56 16,90	$5p ^3D^{\circ} - 5d ^3D$ $5p ^3P^{\circ} - 5d ^3S$ $5p ^1D^{\circ} - 5d ^1D$ $4p'' ^3G^{\circ} - 6s ^3D$ $4p'' ^1D^{\circ} - 5d ^3S$	3—3 1—1 2—2 3—3 2—1
6457,54	3	$\left\{\begin{array}{c} 17,14\\16,23 \end{array}\right.$	19,06 18,15	$4f {}^3G^{\circ} - 7d {}^3G \ 4p {}^{1}V^5D^{\circ} - 6d {}^3P$	$\begin{array}{c} 3-3 \\ 2, 1-1 \end{array}$
6448,49 6443,47 6441,698 6432,78	10 5 40 3	9,06 16,25 15,07 { 14,34 13,39	10,99 18,17 16,99 16,27 15,32	$4p ^3D^{\circ} - 4s^2 ^3P$ $4p'' ^1F^{\circ} - 6d ^3F$ $5p ^3D^{\circ} - 5d ^3F$ $4d ^3P - 4p ^{IV} ^5D^{\circ}$ $5s ^3D - 5p ^1D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 4 \\ 3 - 4 \\ 1 - 0 \\ 3 - 2 \end{array} $
6423,90 6414,62 6411,18 6403,70	30 20 10 5	15,32 14,65 15,29 16,88	17,25 16,58 17,22 18,81	$5p ^{1}D^{\circ} - 5d ^{1}F$ $4p'' ^{3}G^{\circ} - 6s ^{3}D$ $5p ^{3}D^{\circ} - 5d ^{3}D$ $4f ^{3}F^{\circ} - 7d ^{3}F$	2-3 3-2 1-1 4-4 0-1
6377,84	20	15,18	17,11 16,95	$4d ^{1}S - 4f ^{3}D^{\circ}$ $4p'' ^{1}F^{\circ} - 5d ^{3}P$	3—2
6373,27 6357,45 6318,00 6312,83 6311,292	5 15 3 20 30	15,01 15,23 9,06 15,29 15,01	16,96 17,18 11,02 17,25 16,97	$4p'' ^{1}F^{\circ} - 5d ^{3}G$ $5p ^{1}P^{\circ} - 5d ^{1}P$ $4p ^{3}D^{\circ} - 4s^{2} ^{3}P$ $5p ^{3}D^{\circ} - 5d ^{3}F$ $4p'' ^{1}F^{\circ} - 5d ^{3}D$	$ \begin{array}{c} 3-4 \\ 1-1 \\ 1-0 \\ 1-2 \\ 3-3 \end{array} $
6305,956 6300,988 6288,72 6276,708	15 40 5 10	14,99 15,25 14,99 — 14,59	16,96 17,22 16,96 — 16,56	$5p ^{3}P^{\circ} - 5d ^{3}P$ $5p ^{1}F^{\circ} - 5d ^{1}G$ $4p'' ^{1}D^{\circ} - 5d ^{3}P$ - $4p'' ^{3}F^{\circ} - 6s ^{3}D$	1—1 3—4 2—1 — 4—3
6276,624 6273,330 6261,826 6257,86 6219,818 6216,910	10 60 40 5 30 60	14,98 15,01 14,98 15,22 14,96	16,95 16,99 16,96 17,21 16,96	$5p \ ^3F^{\circ} - 5d \ ^3G$ $4p'' \ ^1F^{\circ} - 5d \ ^3F$ $5p \ ^3F^{\circ} - 5d \ ^3G$	4—5 3—4 4—4 2—3 3—4
6208,46 6204,27 6198,11 6188,69 6186,860	15 15 5 20 20	15,25 15,23 14,98 14,99 14,99	17,25 17,23 16,97 16,99 16,99	$5p ^{1}F^{\circ} - 5d ^{1}F$ $5p ^{1}P^{\circ} - 5d ^{1}D$ $5p ^{3}F^{\circ} - 5d ^{3}D$ $5p ^{3}P^{\circ} - 5d ^{3}D$ $4p'' ^{1}D^{\circ} - 5d ^{3}F$	3—3 1—2 4—3 1—2 2—3
6172,020 6158,00 6154,24 6150,42 6114,468	20 5 30 20 20	14,99 14,96 14,89 14,98 14,96	16,99 16,97 16,90 16,99 16,99	$4p'' ^{1}D^{\circ} - 5d ^{3}D$ $5p ^{3}F^{\circ} - 5d ^{3}D$ $5p ^{3}P^{\circ} - 5d ^{3}S$ $5p ^{3}F^{\circ} - 5d ^{3}F$ $5p ^{3}F^{\circ} - 5d ^{3}F$	2—2 3—3 2—1 4—4 3—3
6110,90 6107,45 6105,97 6100,01 6097,33 6080,320	5 10 5 5 10 30	14,96 15,15 15,22 14,96 15,22 8,92	16,99 17,18 17,25 16,99 17,25	$5p \ ^3F^{\circ} - 5d \ ^3F$ $5p \ ^3P^{\circ} - 5d \ ^1P$ $5p \ ^3F^{\circ} - 5d \ ^3F$ $5p \ ^3F^{\circ} - 5d \ ^3F$ $5p \ ^3F^{\circ} - 5d \ ^3F$ $4p \ ^1F^{\circ} - 4s^2 \ ^3P$	3-4 0-1 2-3 3-2 2-2 3-2
6072,25 $6023,25$	5 10	14,52 $14,52$	16,56 16,58	$4p''' 3D^{\circ} - 6s 3D$ $4p''' 3D^{\circ} - 6s 3D$	2—3 2—2

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
6013,40 6000,104	8 40	14,76 14,89	16,82 16,95	4p" 3F°—6s 3D 5p 3P°—5d 3P	$ \begin{array}{c} 2-1 \\ 2-2 \end{array} $
5995,59 5993,27	10 8	15,15 14,89 (14,99	17,22 16,96 17,06	5p ³ P°—5d ³ D 5p ³ P°—5d ³ P 5p ³ P°—5d ³ P	0-1 2-1 1-0
5988,30 5979,20	$\frac{25}{3}$	$\frac{14,20}{14,76}$	16,27 16,83	$4\hat{d}^{3}S - 4p^{1}V^{5}D^{\circ} 4p''^{3}F^{\circ} - 6s^{1}D$	1—0 2—2
5941,168	50	14,89	16,97	$5p\ ^{3}P^{\circ}-5d\ ^{3}D$	2—3
5937,59 5926,90 5901,21 5897,986 5858,63	5 3 5 25 5	15,12 8,86 8,49 14,46 13,43	17,21 10,95 10,59 16,56 15,55	$5p \ ^3D^{\circ} - 5d \ ^3G$ $4p \ ^3D^{\circ} - 4s^2 \ ^3P$ $4p \ ^3F^{\circ} - 4s^2 \ ^1D$ $4p'' \ ^3F^{\circ} - 6s \ ^3D$ $5s \ ^3D - 4p'' \ ^1P^{\circ}$	2-3 2-2 3-2 3-3 2-1
5851,93 5842,67 5833,68 5826,02 5806,00	$\begin{array}{c} 2\\ 4\\ 5\\ 10\\ 25 \end{array}$	14,46 8,86 15,12 15,12 14,43	16,58 10,99 17,25 17,25 16,56	$4p''' 3F^{\circ} - 6s 3D$ $4p 3D^{\circ} - 4s^{2} 3P$ $5p 3D^{\circ} - 5d 1F$ $5p 3D^{\circ} - 5d 3F$ $4p'' 3D^{\circ} - 6s 3D$	3-2 $ 2-1 $ $ 2-3 $ $ 2-2 $ $ 3-3$
5761,37 5759,43 5721,78 5692,41 5689,86	$\begin{array}{c} 2 \\ 5 \\ 20 \\ 2 \\ 5 \end{array}$	14,43 15,07 8,42 15,97 14,65	16,58 17,22 10,59 18,15 16,83	$4p'' \ ^3D^{\circ} - 6s \ ^3D$ $5p \ ^3D^{\circ} - 5d \ ^1G$ $4p \ ^3P^{\circ} - 4s^2 \ ^1D$ $4p \ ^{1V5}P^{\circ} - 6d \ ^3P$ $4d \ ^{1}D - 4p' \ ^3D^{\circ}$	$ \begin{array}{r} 3-2 \\ 3-4 \\ 1-2 \\ 2-2 \\ 2-3 \end{array} $
5682,42 5664,47 5641,30 5635,57 5633,14	$\begin{array}{c} 20 \\ 3 \\ 20 \\ 2 \\ 3 \end{array}$	14,66 14,69 15,23 14,43 14,65	16,82 16,88 17,43 16,63 16,85	$4p'' \ ^3D^{\circ} - 6s \ ^3D$ $4d \ ^1F - 4f \ ^3F^{\circ}$ $5p \ ^1P^{\circ} - 5d \ ^1S$ $4d \ ^3F - 4p' \ ^3G^{\circ}$ $4d \ ^1D - 4f \ ^3P^{\circ}$	1-1 3-4 1-0 4-5 2-2
5615,20 5593,73 5534,98 5482,65 5469,63	5 3 3 3	15,01 14,65 14,99 14,30 14,61	17,22 16,87 17,23 16,56 16,88	$4p'' ^1F^{\circ} - 5d ^1G$ $4d ^1D - 4f ^3F^{\circ}$ $5p ^3P^{\circ} - 5d ^1D$ $4p'' ^3G^{\circ} - 6s ^3D$ $4d ^1G - 4f ^3G^{\circ}$	$ \begin{array}{r} 3-4 \\ 2-3 \\ 1-2 \\ 4-3 \\ 4-5 \end{array} $
5437,36 5393,96 5390,45 5376,85 5368,42	2 3 5 3 10	14,61 14,52 14,70 14,69 14,65	16,89 16,82 16,99 16,99 16,96	$4d ^{1}G$ — $4f ^{3}G^{\circ}$ $4p'' ^{3}D^{\circ}$ — $6s ^{3}D$ $4d ^{3}F$ — $4p' ^{3}G^{\circ}$ $4d ^{1}F$ — $4p' ^{3}G^{\circ}$ $4p'' ^{3}G^{\circ}$ — $5d ^{3}G$	4-4 2-1 2-3 3-3 3-4
5365,62 5276,522 5269,988 5245,36 5229,58	5 15 30 10 3	14,53 14,60 8,23 14,59 14,70	16,84 16,95 10,59 16,95 17,07	$4d ^{1}P - 4f ^{3}P^{\circ}$ $4d ^{3}G - 4p ^{1}V ^{3}H^{\circ}$ $4p ^{3}P^{\circ} - 4s^{2} ^{1}D$ $4p'' ^{3}F^{\circ} - 5d ^{3}G$ $4d ^{3}F - 4p' ^{3}F^{\circ}$	$ \begin{array}{r} 1 \\ 3 \\ 4 \\ 2 \\ 2 \\ 4 \\ 5 \\ 2 \\ \end{array} $
5207,128 5183,364	$\frac{20}{20}$	14,61 14,45	17,00 16,84	$4d {}^{1}G - 4p {}^{1}I H^{\circ}$ $4d {}^{3}P - 4f {}^{3}P^{\circ}$	2-2 4-5 0-1
5175,89	2	14,20	16,59	$4d ^3S - 4p ^{V3}P^{\circ}$	1-2
5158,090	10	$\{\begin{array}{c} 14,45 \\ 14,70 \end{array}$	16,86 17,10	4d ³ F-4d ¹ P° 4d ³ F-4p′ ³ D°	$\begin{array}{c} 0-1 \\ 2-1 \end{array}$
5124 ,461 5120 ,745	$\frac{20}{20}$	42, 42 14,43	16,84 16,85	$4d\ ^3F-4p'\ ^3G^{\circ} \ 4d\ ^3D-4f\ ^3P^{\circ}$	3—4 2—2
5108,331	3	14,43	16,86	$4d~^3D$ — $4f~^1P^\circ$	2-1
5100,08 5093,792	$\frac{10}{20}$	14,43 14,43	16,86 16,86	$4d \ ^{3}D - 4f \ ^{3}D^{\circ} $ $4d \ ^{3}D - 4f \ ^{3}D^{\circ}$	2—3 2—2
5088,932	10	$\begin{array}{c} 14,42 \\ 44,43 \end{array}$	16,86 16,87	$\begin{array}{c} 4d~^3F-4p^{\rm V1}D^{\circ} \ 4d~^3D-4f~^3F^{\circ} \end{array}$	$ \begin{array}{c} 3-2 \\ 2-2 \end{array} $
5088,487	10	14,69	17,13	$4d\ ^{1}F-4f\ ^{1}F^{\circ}$	3—3
5088,260 5083,991	$\frac{30}{15}$	14,43 $14,42$	16,87 16,86	4d ³ D—4f ³ F° 4d ³ F—4f ³ D°	2—3 3—3

λ, Å	I	E _H , eV	EB, eV	Transition	J
5083,991	$\begin{array}{c} 15 \\ 5 \\ 20 \end{array}$	14,43	16,87	4d ³ F-4f ³ F°	4-3
5077,805		14,42	16,86	4d ³ F-4f ³ D°	3-2
5072,293		14,42	16,87	4d ³ F-4f ³ F°	3-3
5067,082	30	14,70	17,14	$4d\ ^{3}F$ — $4f\ ^{3}G^{\circ}$ $4d\ ^{1}F$ — $4f\ ^{1}G^{\circ}$ $4p\ ^{3}P^{\circ}$ — $4s^{2}\ ^{3}P$ $4d\ ^{3}F$ — $4f\ ^{3}G^{\circ}$ $4d\ ^{3}F$ — $4f\ ^{3}G^{\circ}$	2-3
5065,448	40	14,69	17,14		3-4
5060,635	30	8,54	10,99		0-1
5058,897	30	14,43	16,88		4-4
5051,778	60	14,43	16,88		4-5
5047,343	10	14,42	16,88	4d ³ F-4f ³ F°	3-4
5041,322	10	14,39	16,85	4d ³ D-4f ³ P°	3-2
5039,002	10	14,65	17,11	4d ¹ D-4f ¹ D°	2-2
5030,778	2	14,39	16,86	4d ³ D-4pV ¹ D°	3-2
5024,027	5	14,43	16,89	4d ³ F-4f ³ G°	4-4
5021,285	20	14,39	16,86	$4d\ ^{3}D-4f\ ^{3}D^{\circ}\ 4p\ ^{3}F^{\circ}-4s^{2}\ ^{3}P\ ^{4}d\ ^{3}D-4f\ ^{3}D^{\circ}\ ^{4}d\ ^{3}F-4f\ ^{3}G^{\circ}\ ^{4}d\ ^{3}D-4f\ ^{3}F^{\circ}$	3-3
5020,139	5	8,49	10,95		3-2
5015,207	10	14,39	16,86		3-2
5012,611	20	14,42	46,89		3-4
5009,833	20	14,39	16,87		3-3
5006,787	$ \begin{array}{r} 30 \\ 40 \\ 2 \\ 10 \\ 40 \end{array} $	14,65	17,13	4d ¹ D-4f ¹ F°	2-3
4985,503		14,39	16,88	4d ³ D-4f ³ F°	3-4
4985,136		14,43	16,92	4d ³ D-4p' ³ F°	2-3
4980,006		14,62	17,11	4d ³ D-4f ¹ D°	4-2
4974,151		14,65	17,14	4d ¹ D-4f ³ G°	2-3
4973,689	10	14,62	17,11	$^{4d}{}^{3}D - ^{4}f{}^{3}D^{\circ}$	1-1
4969,812	3	14,42	16,92	$^{4d}{}^{3}F - ^{4}p'{}^{3}F^{\circ}$	3-3
4955,964	5	14,34	16,84	$^{4d}{}^{3}G - ^{4}p'{}^{3}G^{\circ}$	4-4
4953,733	50	14,61	17,12	$^{4d}{}^{1}G - ^{4}f{}^{1}H^{\circ}$	4-5
4951,627	12	14,39	16,89	$^{4d}{}^{3}D - ^{4}f{}^{3}G^{\circ}$	3-4
4951,454 4949,479 4943,020 4940,060 4937,967	$\begin{array}{c} 3 \\ 3 \\ 20 \\ 5 \\ 15 \end{array}$	14,61 14,34 14,34 14,34 14,34	17,12 16,84 16,84 16,85 16,85	$4d\ ^{1}G-4f\ ^{3}H^{\circ}\ 4d\ ^{3}P-4f\ ^{3}P^{\circ}\ 4d\ ^{3}P-4f\ ^{3}P^{\circ}\ 4d\ ^{3}P-4f\ ^{3}P^{\circ}\ 4d\ ^{3}P-4f\ ^{3}P^{\circ}$	4-4 $1-1$ $2-1$ $4-0$ $1-2$
4937,196 4931,653 4931,483 4926,390 4921,461	$20 \\ 100 \\ 20 \\ 20 \\ 3$	14,62 14,34 14,34 14,34 14,34	17,43 16,85 16,85 16,86 16,86	4d 3D—4f 3F° 4d 3D—4f 3H° 4d 3P—4f 3P° 4d 3P—4f 1P° 4d 3P—4pV1D°	$ \begin{array}{r} 1-2 \\ 4-5 \\ 2-2 \\ 1-1 \\ 2-2 \end{array} $
4920,031	5	14,34	16,86	4d ³ P — 4f ¹ P°	2-1
4918,373	30	14,60	17,12	4d ³ G — 4f ³ H°	3-4
4915,821	15	14,61	17,14	4d ¹ G — 4f ¹ G°	4-4
4912,909	20	14,34	16,86	4d ³ P — 4f ³ P°	1-2
4912,362	15	14,34	16,86	4d ³ P — 4f ³ P°	2-3
4909,726	$ \begin{array}{r} 100 \\ 5 \\ 20 \\ 25 \\ 3 \end{array} $	14,33	16,85	4d ³ G-4f ³ H°	5-6
4909,032		14,33	16,85	4d ³ G-4f ³ H°	5-5
4906,548		14,34	16,86	4d ³ P-4f ³ D°	2-2
4901,412		14,34	16,87	4d ³ P-4f ³ F°	2-3
4896,396		14,53	17,07	4d ¹ P-4p' ³ F°	1-2
4889,690 4883,761 4883,217 4873,291 4861,548	$\begin{array}{c} 30 \\ 3 \\ 3 \\ 45 \\ 2 \end{array}$	8,42 14,34 14,60 14,60 14,33	10,95 16,88 17,14 17,14 16,88	$4p\ ^{3}P^{\circ}$ — $4s^{2}\ ^{3}P$ $4d\ ^{3}G$ — $4f\ ^{3}F^{\circ}$ $4d\ ^{3}G$ — $4f\ ^{1}G^{\circ}$ $4d\ ^{3}G$ — $4f\ ^{3}G^{\circ}$ $4d\ ^{3}G$ — $4f\ ^{3}F^{\circ}$	1-2 4-4 3-4 3-3 5-4
4854,966	$\begin{array}{c} 30 \\ 15 \\ 2 \end{array}$	14,33	16,88	4d ³ G-4f ³ G°	5 <u>—5</u>
4851,248		14,34	16,89	4d ³ G-4f ³ G°	4—4
4847,368		14,20	16,75	4d ³ S-4pV ³ D°	1—1
4832,236	30	8,42	10,99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
4812,940	40	14,53	17,11		1-2

λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
4807,039	10	14,53	17,11	$4d\ ^{1}P$ — $4f\ ^{3}D)^{\circ}$	1—1
4805,651	3	14,34	16,92	$4d\ ^{3}P$ — $4p'\ ^{3}F^{\circ}$	2—3
4766,729	5	14,20	16,80	$4d\ ^{3}S$ — $4p\ ^{3}P^{\circ}$	1—0
4758,421	30	8,42	11,02	$4p\ ^{3}P^{\circ}$ — $4s^{2}\ ^{3}P$	1—0
4753,458	3	14,34	16,95	$4d\ ^{3}G$ — $4p\ ^{1}^{3}H^{\circ}$	4—4
4687,770	5	15,32	17,96	5p ¹ D°—7s ³ D	2-2
4681,990	50	14,20	16,84	4d ³ S—4f ³ P°	1-1
4673,555	30	14,20	16,85	4d ³ S—4f ³ P°	1-0
4671,686	40	14,20	16,85	4d ³ S—4f ³ P°	1-2
4667,297	15	14,34	17,00	4d ³ G—4pVI ¹ H°	4-5
4662,638	15	14,20	16,86	4d ³ S-4p ^{V 1} D°	1-2
4661,350	15	14,20	16,86	4d ³ S-4f ¹ P°	1-1
4660,294	8	14,45	17,11	4d ³ P-4f ³ D°	0-1
4649,266	10	14,20	16,86	4d ³ S-4f ³ D°	1-2
4608,457	5	14,43	17,12	4d ³ F-4f ¹ H°	4-5
4597,942 4596,903 4555,922 4541,032 4540,335	$ \begin{array}{r} 5 \\ 10 \\ 400 \\ 25 \\ 10 \end{array} $	14,43 14,42 8,23 15,23	17,13 17,12 10,95 17,96	$\begin{array}{c} 4d\ ^{3}D-4f\ ^{1}F^{\circ}\ 4d\ ^{3}F-4f\ ^{3}H^{\circ}\ 4p\ ^{3}P^{\circ}-4s^{2}\ ^{3}P\ 5p\ ^{1}P^{\circ}-7s\ ^{3}D\ -\end{array}$	2-3 3-4 2-2 1-2
4540,207 4516,050 4505,997 4462,684 4444,823	40 5 75 3 3	15,22 8,23 14,34 14,34	17,96 10,99 17,12 17,13	$5p \ ^3F^{\circ} - 7s \ ^3D \ 4p \ ^3P^{\circ} - 4s^2 \ ^3P \ 4d \ ^3G - 4f \ ^1H^{\circ} \ 4d \ ^3P - 4f \ ^1F^{\circ}$	$ \begin{array}{r} -\\ 2-2\\ 2-1\\ 4-5\\ 2-3 \end{array} $
4380,76	2	14,65	17,48	$4d\ ^{1}D-6p\ ^{1}P^{\circ} \ 5p\ ^{3}D^{\circ}-7s\ ^{3}D \ 5p\ ^{3}D^{\circ}-7s\ ^{3}D \ 5p\ ^{3}D^{\circ}-7s\ ^{3}D \ 5s\ ^{3}D-4p\ ^{1}V^{5}D^{\circ}$	2-1
4378,430	8	15,12	17,95		2-3
4365,362	30	15,12	17,96		2-2
4292,469	30	15,07	17,95		3-3
4291,10	2	13,39	16,28		3-3
4285,239	$ \begin{array}{c} 40 \\ 20 \\ 30 \\ 3 \\ 2 \end{array} $	15,32	18,21	$5p ^{1}D^{\circ} - 7s ^{3}D$	2-1
4279,959		15,07	17,96	$5p ^{3}D^{\circ} - 7s ^{3}D$	3-2
4276,044		15,32	18,22	$5p ^{1}D^{\circ} - 7s ^{1}D$	2-2
4255,59		14,30	17,11	$4d ^{3}S - 4f ^{1}D^{\circ}$	1-2
4243,35		15,23	18,15	$5p ^{1}P^{\circ} - 6d ^{3}P$	1-1
4239,448	25	15,29	18,21	$5p ^3D^{\circ} - 7s ^3D$	1-1
4230,444	10	15,29	18,22	$5p ^3D^{\circ} - 7s ^1D$	1-2
4227,936	30	8,92	11,85	$4p ^1F^{\circ} - 4s^2 ^1G$	3-4
4216,89	3	15,23	18,17	$5p ^1P^{\circ} - 6d ^3D$	1-2
4211,861	3	15,01	17,95	$4p'' ^1F^{\circ} - 7s ^3D$	3-3
4179,512 4176,11 4171,858 4164,288 4162,296	$\begin{array}{c} 30 \\ 5 \\ 25 \\ 20 \\ 8 \end{array}$	15,25 14,99 14,99 14,99 15,23	18,22 17,95 17,96 17,96 18,21	$5p ^{1}F^{\circ} - 7s ^{1}D$ $4p'' ^{1}D^{\circ} - 7s ^{3}D$ $5p ^{3}P^{\circ} - 7s ^{3}D$ $4p'' ^{1}D^{\circ} - 7s ^{3}D$ $5p ^{1}P^{\circ} - 7s ^{3}D$	$ \begin{array}{r} 3-2 \\ 2-3 \\ 4-2 \\ 2-2 \\ 4-1 \end{array} $
4161,155	30	14,98	17,95	$5p \ ^3F^{\circ} - 7s \ ^3D$	4-3 $ 1-2 $ $ 3-3 $ $ 2-1 $ $ 2-2 $ $ 3-2$
4153,623	10	15,23	18,22	$5p \ ^1P^{\circ} - 7s \ ^1D$	
4143,020	5	14,96	17,95	$5p \ ^3F^{\circ} - 7s \ ^3D$	
4141,296	20	15,22	18,21	$5p \ ^3F^{\circ} - 7s \ ^3D$	
4132,62	3	15,22	18,22	$5p \ ^3F^{\circ} - 7s \ ^3D$	
4131,359	35	14,96	17,96	$5p \ ^3F^{\circ} - 3s \ ^3D$	
4068,090	5	15,12	18,17	$5p \ ^{3}D^{\circ}-6d \ ^{3}F$ $5p \ ^{3}D^{\circ}-6d \ ^{3}D$ $5p \ ^{3}P^{\circ}-7s \ ^{3}D$ $5p \ ^{3}P^{\circ}-7s \ ^{3}D$ $4p \ ^{3}D^{\circ}-4s^{2} \ ^{1}G$ $5p \ ^{3}P^{\circ}-7s \ ^{3}D$	2-3
4065,009	3	15,12	18,17		2-2
4053,658	10	15,15	18,21		0-1
4043,751	35	14,89	17,95		2-3
4043,502	75	8,78	11,85		3-4
4032,642	3	14,89	17,96		2-2
4014 ,18 540	2	15,12	18,21	$5p^3D^{\circ}-7s^3D$	2-1

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4006 ,159	$\frac{3}{2}$	15,12	18,22	5p ³ D°—7s ¹ D	2—2
4003 ,470		15,07	18,16	5p ³ D°—6d ³ D	3—3
3993,295	5	15,07	18,47	$5p \ ^3D^{\circ} - 6d \ ^3F$ $5p \ ^1D^{\circ} - 6d \ ^1F$ $4p'' \ ^1F^{\circ} - 6d \ ^3P$ $5p \ ^3D^{\circ} - 6d \ ^3F$ $4p'' \ ^1F^{\circ} - 6d \ ^3D$	3-4
3987,021	3	15,32	18,43		2-3
3945,749	2	15,01	18,15		3-2
3945,570	5	15,29	18,43		1-2
3933,260	3	15,01	18,16		3-3
3923,438	3	15,01	18,17	$4p'' ^{1}F^{\circ} - 6d ^{3}F$ $5p ^{1}F^{\circ} - 6d ^{1}G$ $5p ^{3}F^{\circ} - 6d ^{3}G$ $5p ^{3}P^{\circ} - 6d ^{3}D$ $4p'' ^{1}D^{\circ} - 6d ^{3}F$	3-4
3920,641	5	15,25	18,41		3-4
3903,163	15	14,98	18,15		4-5
3896,682	3	14,99	18,17		1-2
3892,913	5	14,99	18,17		2-3
3891 ,114	2	15,23	18,42	$5p ^{1}P^{\circ} - 6d ^{1}D$	1-2
3890 ,073	3	14,99	18,17	$4p'' ^{1}D^{\circ} - 6d ^{3}D$	2-2
3884 ,523	5	15,22	18,41	$5p ^{3}F^{\circ} - 6d ^{3}G$	2-3
3884 ,120	10	14,96	18,15	$5p ^{3}F^{\circ} - 6d ^{3}G$	3-4
3879 ,387	5	14,98	18,17	$5p ^{3}F^{\circ} - 6d ^{3}F$	4-4
3868,358	3	14,76	17,96	$4p'' \ ^3F^{\circ} - 7s \ ^3D$	2-2
3866,291	2	15,01	18,22	$4p'' \ ^1F^{\circ} - 7s \ ^1D$	3-2
3864,121	5	14,96	18,17	$5p \ ^3F^{\circ} - 6d \ ^3F$	3-3
3850,03	2	14,99	18,21	$5p \ ^3P^{\circ} - 7s \ ^3D$	1-1
3849,570	2	13,39	16,61	$5s \ ^3D - 4p^{\circ} \ ^3D^{\circ}$	3-3
3842,577	4	14,99	18,22	$5p \ ^{3}P^{\circ}-7s \ ^{1}D$	1-2 $2-2$ $2-1$ $1-0$ $2-2$
3836,150	4	14,99	18,22	$4p'' \ ^{1}D^{\circ}-7s \ ^{1}D$	
3826,908	5	14,89	18,13	$5p \ ^{3}P^{\circ}-6d \ ^{3}S$	
3818,869	3	14,99	18,24	$5p \ ^{3}P^{\circ}-6d \ ^{3}P$	
3797,832	5	14,89	18,15	$5p \ ^{3}P^{\circ}-6d \ ^{3}P$	
3786,261	5	14,89	18,16	$5p ^3P^{\circ} - 6d ^3D$	2-3
3748,207	3	14,65	17,95	$4p'' ^3G^{\circ} - 7s ^3D$	3-3
3738,637	3	14,65	17,96	$4p'' ^3G^{\circ} - 7s ^3D$	3-2
3686,555	100	8,49	11,85	$4p ^3F^{\circ} - 4s^2 ^1G$	3-4
3682,428	10	14,59	17,95	$4p'' ^3F^{\circ} - 7s ^3D$	4-3
3602 ,227	2	14,52	17,96	$4p''\ ^3D^{\circ} - 7s\ ^3D$	2-2
3548 ,742	3	14,46	17,95	$4p''\ ^3F^{\circ} - 7s\ ^3D$	3-3
3384 ,948	3	14,70	18,36	$4d\ ^3F - 5f\ ^3F^{\circ}$	2-2
3380 ,717	10	14,70	18,36	$4d\ ^3F - 5f\ ^3G^{\circ}$	2-3
3379 ,961	3	14,69	18,36	$4d\ ^1F - 5f\ ^1F^{\circ}$	3-3
3378,512	3	14,43	18,10	$4d\ ^3D-5f\ ^3D^\circ \ 4d\ ^3D-5f\ ^3D^\circ \ 4d\ ^1F-5f\ ^1G^\circ \ 4d\ ^3D-5f\ ^3F^\circ \ 4d\ ^3F-5f\ ^3F^\circ \ $	2-3
3377,706	5	14,43	18,10		2-2
3374,953	20	14,69	18,36		3-4
3373,594	15	14,43	18,10		2-3
3371,412	8	14,43	18,10		4-4
3370,457 3366,560 3366,269 3365,65 3352,044	30 5 10 15 8	14,43 14,42 14,42 14,42 14,65	18,10 18,10 18,10 18,10 18,35	$4d\ ^3F - 5f\ ^3G^{\circ}$ $4d\ ^3F - 5f\ ^3F^{\circ}$ $4d\ ^3F - 5f\ ^3F^{\circ}$ $4d\ ^3F - 5f\ ^3G^{\circ}$ $4d\ ^1D - 5f\ ^1D^{\circ}$	4-5 3-3 3-4 3-4 2-2 3-2
3349,463 3343,743 3339,084 3338,937 3338,647	5 20 3 3 10	14,39 { 14,65 14,39 14,65 14,39 14,39	18,09 18,36 18,10 18,36 18,10 18,10	4d ³ D-5f ³ P° 4d ¹ D-5f ¹ F° 4d ³ D-5f ³ D° 4d ¹ D-5f ³ G° 4d ³ D-5f ³ F° 4d ³ D-5f ³ F°	2-3 3-3 2-3 3-3 3-4
3325,812 3323,735 3317,440 3316,279 3303,516	8 5 5 20 5	14,62 	18,35 18,36 18,09 18,09 18,09	$4d\ ^3D-5f\ ^1D^\circ -\ -\ 4d\ ^3D-5f\ ^3F^\circ -\ 4d\ ^3P-5f\ ^3P^\circ -\ 4d\ ^3P^\circ -\ 4d\ ^3P-5f\ ^3P^\circ -\ 4d\ ^3P^\circ -\ 4d\ ^3P^\circ -\ 4d\ ^3P-5f\ ^3P^\circ -\ 4d\ ^3P$	1-2 - 1-2 4-5 2-1 1-2

λ, Å	I	E _{II} , eV	E _B , eV	Transition	J
3301,228 3300,885 3300,644 3300,444	40 20 10 5	14,34 14,60 14,34 14,34	18,09 18,35 18,09 18,10	4d ³ G-5f ³ H° 4d ³ G-5f ³ H° 4d ³ P-5f ³ P° 4d ³ P-5f ¹ P°	$ \begin{array}{r} 4-5 \\ 3-4 \\ 2-2 \\ 1-1 \\ \end{array} $
3297, 199 3295, 103 3294, 336 3293, 334 3292, 124 3290, 422	10 15 3 2 10 50	14,34 14,34 14,34 14,60 14,34 { 14,33	18,10 18,10 18,10 18,36 18,10 18,09	4d ³ P-5f ³ D° 4d ³ P-5f ³ D° 4d ³ P-5f ³ D° 4d ³ G-5f ³ G° 4d ³ G-5f ³ G° 4d ³ G-5f ³ H°	1-2 2-3 2-2 3-3 4-4 5-6
3281,696 3250,469 3238,83 3218,77 3186,017	10 10 5 3 5	14,34 14,33 14,53 14,98 14,96 14,20	18,10 18,35 18,80 18,81 18,09	$4d\ ^{3}P-5f\ ^{3}F^{\circ}$ $4d\ ^{3}G-5f\ ^{3}G^{\circ}$ $4d\ ^{1}P-5f\ ^{1}D^{\circ}$ $5p\ ^{3}F^{\circ}-7d\ ^{3}G$ $5p\ ^{3}F^{\circ}-7d\ ^{3}F$ $4d\ ^{3}S-5f\ ^{3}P^{\circ}$	2-3 $5-5$ $1-2$ $4-5$ $3-3$ $1-0$
3185,729 3184,843 3182,175 3179,793 3177,965	2 15 10 5 3	13,39 14,20 14,20 14,45 14,89	17,28 18,09 18,09 18,35 18,79	5s 3D—6p 3F° 4d 3S—5f 3P° 4d 3S—5f 3P° 4d 3P—5f 3D° 5p 3P°—7d 3S	3-4 1-1 1-2 0-1 2-1
3166 ,56 3162 ,03 3158 ,64 3152 ,883 3151 ,049	5 3 5 3 10	14,89 14,89 13,65 14,42 13,39	18,80 18,81 17,57 18,35 17,32	$5p ^3P^{\circ} - 7d ^3P$ $5p ^3P^{\circ} - 7d ^3D$ $5s ^3D - 6p ^3F^{\circ}$ $4d ^3F - 5f ^3H^{\circ}$ $5s ^3D - 6p ^3D^{\circ}$	2-2 2-3 1-2 3-4 3-3
3150,538 2986,33 2945,368 2884,1955 2877,6996	3 2 2 60 40	{ 14,43 10,95 14,20 11,02 9,09 9,12	18,36 14,89 18,35 15,23 13,39 13,43	$4d\ ^3F - 5f\ ^3G^\circ$ $4s^2\ ^3P - 5p\ ^3P^\circ$ $4d\ ^3S - 5f\ ^1D^\circ$ $4s^2\ ^3P - 5p\ ^1P^\circ$ $4p\ ^1D^\circ - 5s\ ^3D$ $4p\ ^1P^\circ - 5s\ ^3D$	4-3 2-2 1-2 0-1 2-3 1-2
2857 ,746 2848 ,72 2840 ,489 2837 ,3685 2830 ,31	5 2 2 50 2	9,09 14,42 10,95 9,06 14,39	13,43 18,77 15,32 13,43 18,77	$4p ^{1}D^{\circ} - 5s ^{3}D$ $4d ^{3}F - 6f ^{3}F^{\circ}$ $4s^{2} ^{3}P - 5p ^{1}D^{\circ}$ $4p ^{3}D^{\circ} - 5s ^{3}D$ $4d ^{3}D - 6f ^{3}D^{\circ}$	2-2 3-3 2-2 1-2 3-3
2810,80 2799,69 2799,536 2797,44 2797,26	3 2 5 2 2	14,61 14,60 14,34 14,34	19,02 19,02 18,77 18,77 18,77	4d ¹ G6f ¹ H° 4d ³ G6f ³ H° 4d ³ G6f ³ H° 4d ³ P6f ³ P° 4d ³ P6f ³ D°	4-5 3-4 4-5 2-2 1-2
2795,34 2791,798 2769,6693 2745,2740 2739,7658	2 10 50 20 8	14,34 14,33 8,92 8,92 9,12	18,77 18,77 13,39 13,43 13,65	$4d \ ^{3}P - 6f \ ^{3}D^{\circ}$ $4d \ ^{3}G - 6f \ ^{3}H^{\circ}$ $4p \ ^{1}F^{\circ} - 5s \ ^{3}D$ $4p \ ^{1}F^{\circ} - 5s \ ^{3}D$ $4p \ ^{1}P^{\circ} - 5s \ ^{3}D$	2-3 5-6 3-3 3-2 1-1
2737,3422 2731,93 2721,6771 2718,775 2713,5079	10 2 25 35 50	8,86 10,59 9,09 9,12 8,86	13,39 15,12 13,65 13,68 13,43	$4p \ ^{3}D^{\circ} - 5s \ ^{3}D$ $4s^{2} \ ^{1}D - 5p \ ^{3}D^{\circ}$ $4p \ ^{1}D^{\circ} - 5s \ ^{3}D$ $4p \ ^{1}P^{\circ} - 5s \ ^{1}D$ $4p \ ^{3}D^{\circ} - 5s \ ^{3}D$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 2-1 \\ 1-2 \\ 2-2 \end{array} $
2711,88 2703,184 2700,963 2689,2998 2676,08 2666,2910	5 30 30 50 2 20	14,20 9,06 9,09 8,78 10,59 8,78	18,77 13,65 13,68 13,39 15,22 13,43	$4d\ ^3S - 6f\ ^3P^\circ$ $4p\ ^3D^\circ - 5s\ ^3D$ $4p\ ^1D^\circ - 5s\ ^1D$ $4p\ ^3D^\circ - 5s\ ^3D$ $4s^2\ ^1D - 5p\ ^3F^\circ$ $4p\ ^3D^\circ - 5s\ ^3D$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 2-2 \\ 3-3 \\ 2-2 \\ 3-2 \end{array} $
2648,60	3	8,87	13,55	$4s^{2} {}^{3}F - 4p' {}^{5}D^{\circ}$	3—3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2620,6663	5	8,66	13,39	$4p \ ^3F^{\circ} - 5s \ ^3D$	2-3
2614,41	8	8,64	13,38	$4s^2 \ ^3F - 4p' \ ^5D^{\circ}$	4-4
2600,2711	20	8,92	13,68	$4p \ ^1F^{\circ} - 5s \ ^1D$	3-2
2598 ,8125	20	8,66	13,43	$4p \ ^3F^{\circ} - 5s \ ^3D$	2-2
2590 ,5290	15	8,86	13,65	$4p \ ^3D^{\circ} - 5s \ ^3D$	2-1
2571 ,7563	10	8,86	13,68	$4p \ ^3D^{\circ} - 5s \ ^1D$	2-2
2553 ,32	3	9,02	13,87	$4s^2 \ ^3F - 4p' \ ^5G^{\circ}$	2-3
2544 ,8055	100	8,52	13,39	$4p \ ^3F^{\circ} - 5s \ ^3D$	4-3
2529,3048	50	8,78	13,68	$4p\ ^3D^{\circ}-5s\ ^1D$ $4p\ ^3F^{\circ}-5s\ ^3D$ $4s^2\ ^3F-4p'\ ^5G^{\circ}$ $4p\ ^3F^{\circ}-5s\ ^3D$ $4s\ ^1D-4p\ ^3P^{\circ}$	3-2
2526,5929	25	8,49	13,39		3-3
2518,95	8	8,87	13,79		3-4
2506,2732	30	8,49	13,43		3-2
2489,664	5	3,26	8,23		2-2
2485,794	20	8,66	13,65	4p 3F°—5s 3D	2-1
2473,3339	20	8,42	13,43	4p 3P°—5s 3D	1-2
2468,5006	5	8,66	13,68	4p 3F°—5s 1D	2-2
2448,21	5	11,02	16,09	4s ² 3P°—4p ^{IV} 5P°	0-1
2443,32	6	9,12	14,20	4p 1P°—4d 3S	1-1
2442,67	15	8,64	13,72	4s ² ³ F-4p' ⁵ G°	4—5
2428,92	8	9,09	14,20	4p ¹ D°-4d ³ S	2—1
2424,428	50	8,54	13,65	4p ³ P°-5s ³ D	0—1
2414,84	5	10,95	16,09	4s ² ³ P-4p ^{IV} ⁵ P°	2—1
2414,18	5	9,06	14,20	4p ³ D°-4d ³ S	1—1
2403,3378	100	8,23	13,39	$4p \ ^{3}P^{\circ} - 5s \ ^{3}D$ $4s \ ^{1}D - 4p \ ^{3}P^{\circ}$ $4p \ ^{3}P^{\circ} - 5s \ ^{3}D$ $4p \ ^{3}F^{\circ} - 5s \ ^{1}D$ $4s^{2} \ ^{3}P - 4p^{1}V \ ^{5}D^{\circ}$	2—3
2400,1138	20	3,26	8,42		2—1
2384,9441	10	8,23	13,43		2—2
2384,80	5	8,49	13,68		3—2
2379,39	3	11,02	16,23		0—2, 1
2378,83	10	10,95	16,16	$4s^{2} {}^{3}P - 4p'' {}^{3}P^{\circ} \ 4s^{2} {}^{3}F - 4p' {}^{5}F^{\circ} \ 4p {}^{1}P^{\circ} - 4d {}^{3}P \ 4p {}^{3}P^{\circ} - 5s {}^{3}D \ 4s {}^{1}D - 4p {}^{3}F^{\circ}$	2-2
2378,39	2	9,02	14,23		2-1
2376,29	50	9,12	14,34		1-1
2370,7474	20	8,42	13,65		1-1
2369,8897	100	3,26	8,49		2-3
2364,45	3	9,09	14,34	$4p ^1D^{\circ} - 4d ^3P$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 1-2, 1 \\ 1-2 \\ 1-2 \end{array} $
2362,68	2	9,09	14,34	$4p ^1D^{\circ} - 4d ^3P$	
2361,49	3	10,99	16,23	$4s^2 ^3P - 4p^{\mathrm{IV}} ^5D^{\circ}$	
2356,6410	10	2,98	8,23	$4s ^3D - 4p ^3P^{\circ}$	
2355,0141	15	8,42	13,68	$4p ^3P^{\circ} - 5s ^1D$	
2353,96	2	8,87	14,13	$4s^{2} {}^{3}F - 4p' {}^{6}F^{\circ}$ $4p {}^{3}D^{\circ} - 4d {}^{3}P$ $4s^{2} {}^{3}P - 4p''' {}^{1}F^{\circ}$ $4p {}^{1}D^{\circ} - 4d {}^{3}D$ $4p {}^{1}P^{\circ} - 4d {}^{3}D$	3-3
2348,74	15	9,06	14,34		1-1
2342,17	3	10,95	16,25		2-3
2339,73	3	9,09	14,39		2-3
2336,17	20	9,12	14,43		1-2
2323,01 2309,51 2299,47 2294,3683 2290,998 2286,642 2278,33 2276,2582 2274,74	15 15 7	9,09 9,06 9,06 2,83 9,12 8,92 9,09 2,98 8,23 9,06	14,43 14,43 14,45 8,23 14,53 14,34 14,53 8,42 13,68 14,53	$4p ^{1}D^{\circ} - 4d ^{3}D$ $4p ^{3}D^{\circ} - 4d ^{3}D$ $4p ^{3}D^{\circ} - 4d ^{3}P$ $4s ^{3}D - 4p ^{3}P^{\circ}$ $4p ^{1}P^{\circ} - 4d ^{1}P$ $4p ^{1}P^{\circ} - 4d ^{1}P$ $4p ^{1}D^{\circ} - 4d ^{1}P$ $4s ^{3}D - 4p ^{3}P^{\circ}$ $4p ^{3}P^{\circ} - 5s ^{1}D$ $4p ^{3}D^{\circ} - 4d ^{1}P$	$\begin{array}{c} 2-2 \\ 1-2 \\ 1-0 \\ 2-2 \\ 1-1 \\ 3-2 \\ 2-1 \\ 1-1 \\ 2-2 \\ 1-1 \end{array}$
2265, 36 2263, 780 2263, 212 2254, 975 2253, 00 2251, 84	35 8 6 2 2	8,92 8,86 9,12 10,59 9,09	14,39 14,34 14,62 16,09 14,60	$4p ^{1}F^{\circ}-4d ^{3}D$ $4p ^{3}D^{\circ}-4d ^{3}P$ $4p ^{1}P^{\circ}-4d ^{3}D$ $4s^{2} ^{1}D-4p ^{IV} ^{5}P^{\circ}$ $4p ^{1}D^{\circ}-4d ^{3}G$	3-3 2-1 1-1 2-1 2-3

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λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
2248,960 2247,002 2243,10 2242,6183 2242,14	25 75 6 50 6	8,92 2,72 9,12 3,26 8,86	14,43 8,23 14,65 8,78 14,39	$4p ^{1}F^{\circ}$ $-4d ^{3}F$ $4s ^{3}D$ $-4p ^{3}P^{\circ}$ $4p ^{1}P^{\circ}$ $-4d ^{1}D$ $4s ^{1}D$ $-4p ^{3}D^{\circ}$ $4p ^{3}D^{\circ}$ $-4d ^{3}D$	3-4 3-2 1-2 2-3 2-3
2231,571 2230,948 2230,40 2230,087 2229,850	30 30 40 30 30	8,78 9,09 8,78 9,06 8,83	14,34 14,65 14,34 14,62 14,42	$4p \ ^3D^{\circ}$ — $4d \ ^3P$ $4p \ ^1D^{\circ}$ — $4d \ ^1D$ $4p \ ^3D^{\circ}$ — $4d \ ^3G$ $4p \ ^3D^{\circ}$ — $4d \ ^3D$ $4p \ ^3D^{\circ}$ — $4d \ ^3F$	3-2 2-2 3-4 1-1 2-3
2228,8700 2226,773 2224,701 2221,65 2218,504	$ \begin{array}{r} 40 \\ 40 \\ 15 \\ 2 \\ 25 \end{array} $	2,98 8,86 9,12 10,59 9,06	8,54 14,43 14,70 16,16 14,65	$4s ^3D - 4p ^3P^{\circ}$ $4p ^3D^{\circ} - 4d ^3D$ $4p ^1P^{\circ} - 4d ^3F$ $4s^2 ^1D - 4p''' ^3P^{\circ}$ $4p ^3D^{\circ} - 4d ^1D$	1—0 2—2 1—2 2—2 1—2
2218,1082 2215,100 2212,741 2210,2684 2209,795	50 35 40 60 30	2,83 9,09 9,09 3,26 8,78	8,42 14,69 14,70 8,86 14,39	$4s ^{3}D - 4p ^{3}P^{\circ}$ $4p ^{1}D^{\circ} - 4d ^{1}F$ $4p ^{1}D^{\circ} - 4d ^{3}F$ $4s ^{1}D - 4p ^{3}D^{\circ}$ $4p ^{3}D^{\circ} - 4d ^{3}D$	$ \begin{array}{c} 2-1 \\ 2-3 \\ 2-2 \\ 2-2 \\ 3-3 \end{array} $
2200 ,498 2195 ,674 2192 ,2678	25 25 7 5	9,06 8,78 2,83 (3,26	14,70 14,43 8,49 8,92	$4p \ ^3D^{\circ}-4d \ ^3F \ 4p \ ^3D^{\circ}-4d \ ^3F \ 4s \ ^3D-4p \ ^3F^{\circ} \ 4s \ ^1D-4p \ ^1F^{\circ}$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 2-3 \\ 2-3 \end{array} $
2189,6323 2189,36	50 3	8,64 10,59 8,54	14,30 16,25 14,20	$4s^{2} {}^{3}F - 4p'' {}^{3}G^{\circ}$ $4s^{2} {}^{1}D - 4p''' {}^{1}F^{\circ}$ $4p {}^{3}P^{\circ} - 4d {}^{3}S$	$ \begin{array}{c} 4 - 4 \\ 2 - 3 \\ 0 - 1 \end{array} $
2182,85 2181,41 2180,74 2179,399 2174,968	6 4 10 60 35	8,66 8,92 8,64 2,98 8,92	14,34 14,60 14,33 8,66 14,61	$4p\ ^3F^{\circ}-4d\ ^3P$ $4p\ ^1F^{\circ}-4d\ ^3G$ $4s^2\ ^3F-4p\ ^n\ ^3F^{\circ}$ $4s\ ^3D-4p\ ^3F^{\circ}$ $4p\ ^1F^{\circ}-4d\ ^1G$	$ \begin{array}{r} 2-1 \\ 3-3 \\ 4-5 \\ 1-2 \\ 3-4 \end{array} $
2161,314 2151,801 2148,9838 2146,91 2145,48	20 25 60 8 15	8,86 8,66 2,72 8,92 8,42	14,60 14,42 8,49 14,69 14,20	4p 3D°—4d 3G 4d 3F°—4d 3F 4s 3D—4p 3F° 4p 1F°—4d 1F 4p 3P°—4d 3S	2-3 2-3 3-3 3-3 1-1
2144,70 2135,9815 2134,3413 2131,23 2130,08 2126,0449 2125,24 2125,098 2122,9793 2118,38 2117,300 2112,1001 2111,30 2106,39	2 75 35 2 8 50 4 8 50 2 35 30 6 2	$ \left\{ \begin{array}{l} 8,92 \\ 8,87 \\ 2,72 \\ 8,52 \\ 3,26 \\ 8,78 \\ 8,52 \\ 2,83 \\ 8,86 \\ 8,78 \\ 3,26 \\ 8,49 \\ 8,49 \\ 3,26 \\ 8,52 \\ 8,87 \end{array} \right.$	14,70 14,65 8,52 14,33 9,06 14,60 14,34 8,66 14,70 14,61 9,09 14,34 14,34 9,12 14,39 14,75	$4p^{1}F^{\circ}-4d^{3}F$ $4s^{2}^{3}F-4p''^{3}G^{\circ}$ $4s^{3}D-4p^{3}F^{\circ}$ $4p^{3}F^{\circ}-4d^{3}G$ $4s^{1}D-4p^{3}D^{\circ}$ $4p^{3}D^{\circ}-4d^{3}G$ $4p^{3}F^{\circ}-4d^{3}G$ $4s^{3}D-4p^{3}F^{\circ}$ $4p^{3}D^{\circ}-4d^{3}F$ $4p^{3}D^{\circ}-4d^{3}F$ $4p^{3}D^{\circ}-4d^{3}F$ $4p^{3}D^{\circ}-4d^{3}F$ $4p^{3}F^{\circ}-4d^{3}P$ $4p^{3}F^{\circ}-4d^{3}P$ $4p^{3}F^{\circ}-4d^{3}D$ $4s^{3}F^{\circ}-4d^{3}D$ $4s^{2}^{3}F-4d^{3}D$ $4s^{2}^{3}F-4d^{3}D$	3-2 3-3 3-4 4-5 2-1 3-3 4-4 2-2 2-2 3-4 2-2 3-2 3-4 2-1 4-3 3-4
2104,7971 2098,72 2098,386 2094,77 2093,606 2087,930	40 2 15 2 10 35	2,98 8,49 8,52 8,42 8,42 { 8,49 8,66	8,86 14,39 14,43 14,34 14,34 14,42 14,60	4s 3D - 4p 3D° 4p 3F° - 4d 3D 4p 3F° - 4d 3F 4p 3P° - 4d 3P 4p 3P° - 4d 3P 4p 3F° - 4d 3F 4p 3F° - 4d 3F 4p 3F° - 4d 3G	1-2 3-3 4-4 1-2 1-1 3-3 2-3

λ, Å	I	E _{II} , eV	EB, eV	Transition	J
2085,295 2084,33 2082,92 2080,03 2078,646	8 2 2 2 40	2,72 8,64 2,83 8,66 8,23	8,66 14,59 8,78 14,62 14,20	$4s ^3D - 4p ^3F^{\circ}$ $4s^2 ^3F - 4p '' ^3F^{\circ}$ $4s ^3D - 4p ^3D^{\circ}$ $4p ^3F^{\circ} - 4d ^3D$ $4p ^3P^{\circ} - 4d ^3S$	3-2 4-4 2-3 2-1 2-1
2069,92 2066,25 2062,41 2054,9795 2054,43	2 8 10 50 6	8,66 8,54 8,42 2,83 8,42	14,65 14,53 14,43 8,86 14,45	4p 3P°-4d 1D 4p 3P°-4d 1P 4p 3P°-4d 3D 4s 3D-4p 3D° 4p 3P°-4d 3P	2—2 0—1 1—2 2—2 1—0
2054,27 2047,65 2043,8031 2037,1269 2035,8539	4 8 60 30 30	8,66 9,12 2,72 2,83 2,98	14,70 15,18 8,78 8,92 9,06	4p 3F°—4d 3F 4p 1P°—4d 1S 4s 3D—4p 3D° 4s 3D—4p 1F° 4s 3D—4p 3D°	2—2 1—0 3—3 2—3 1—1
2031,023 2025,4902 2016,885 2015,576 2012,96	15 8 8 5 15	8,23 2,98 2,72 2,98 8,23	14,34 9,09 8,86 9,12 14,39	4p 3P°-4d 3P 4s 3D-4p 1D° 4s 3D-4p 3D° 4s 3D-4p 1P° 4p 3P°-4d 3D°	2-2 1-2 3-2 1-1 2-3
1999 ,7000 1989 ,2116 1979 ,3124 1977 ,02 1970 ,489	30	2,72 2,83 2,83 9,02 2,83	8,92 $9,06$ $9,09$ $15,29$ $9,12$	$4s ^3J) - 4p ^1F^c$ $4s ^3D - 4p ^3D^c$ $4s ^3D - 4p ^1D^c$ $4s^2 ^3F - 5p ^3D^c$ $4s ^3D - 4p ^1P^c$	$ \begin{array}{r} 3-3 \\ 2-1 \\ 2-2 \\ 2-1 \\ 2-1 \end{array} $
1967,99 1957,51 1952,56 1946,49 1944,586	2 20 5 10 25	8,23 8,64 8,87 8,64 2,72	14,53 14,98 15,22 15,01 9,09	$4p^{3}P^{\circ}-4d^{1}P$ $4s^{2}^{3}F-5p^{3}F^{\circ}$ $4s^{2}^{3}F-5p^{3}F^{\circ}$ $4s^{2}^{3}F-4p''^{1}F^{\circ}$ $4s^{3}D-4p^{1}D^{\circ}$	2—1 4—4 3—2 4—3 3—2
1929,74	25	$\left\{\begin{array}{c} 8,64\\10,59\end{array}\right.$	15,07 17,01	$4s^2 {}^3F - 5p {}^3D^{\circ} 4s^2 {}^1D - 4p^{V} {}^1P^{\circ}$	4—3 2—1
1922,13 1920,665 1807,84	5 5 15	$8,87 \\ 8,23 \\ 11,02$	45,32 14,69 17,88	$4s^2 {}^3F - 5p {}^1D^\circ \ 4p {}^3P^\circ - 4d {}^1F \ 4s^2 {}^3P - 4p {}^{\mathrm{IV}} 3^\circ$	3-2 2-3 0-1
1800,95	2	8,64	15,53	$4s^2 {}^3F - 4p''' {}^3D^{\circ}$	4—3
1790,65 $1753,27$	5 15	9,02 $8,87$	15,94 15,94	$4s^2 {}^3F - 4p''' {}^3F^{\circ} $ $4s^2 {}^3F - 4p''' {}^3F^{\circ}$	$\begin{array}{c} 2-2 \\ 3-2 \end{array}$
1744,50	20	$ \begin{cases} 9,02 \\ 8,87 \\ 10,99 \end{cases} $	16,09 45,97 18,09	$4s^2 {}^3F - 4p^{\text{IV}} {}^5P^{\text{c}}$ $4s^2 {}^3F - 4p^{\text{IV}} {}^5P^{\text{c}}$ $4s^2 {}^3P - 5f {}^3P^{\text{c}}$	$ \begin{array}{c} 2-1 \\ 3-2 \\ 1-2 \end{array} $
1736,54	$\frac{40}{3}$	8,87	16,01	$\frac{4s^2 \ ^3F - 4p^{\text{IV}} \ ^5P^c}{4s^2 \ ^3F - 4p''' \ ^3P^\circ}$	$\begin{array}{c} 3-3 \\ 2-2 \end{array}$
1734 ,21 1717 ,72	15	9,02 9,02	16,16 $16,23$	$4s^2 {}^3F - 4p^{\text{IV}} {}^5D^{\text{c}}$	2—2 2—2, 1
1699,09	30	$\begin{cases} 8,64 \\ 8,87 \end{cases}$	15,94 16,16	$\frac{4s^2}{4s^2} {}^{3}F - \frac{4}{4}p''' {}^{3}F^{\circ}$ $\frac{4s^2}{3}F - \frac{4}{4}p''' {}^{3}P^{\circ}$	4—3 3—2
1683,15	40	$ \begin{cases} 8,64 \\ 8,87 \end{cases} $	16,01 16,23	$4s^2 {}^3F - 4p^{\text{IV}} {}^5P^{\circ} $ $4s^2 {}^3F - 4p^{\text{IV}} {}^5D^{\circ}$	4—3 3—2, 1
1672,77 1663,001	7 10 30	8,87 9,12	16,28 16,58	$\frac{4s^2}{4p}^{3}F - \frac{4p}{4p}^{1}V {}^{5}D^{c}$ $\frac{4p}{4p}^{1}P^{o} - 6s {}^{3}D$	3—3 1—2
1660,000 1656,321 1649,457	9 20 6 20	9,09 90,9 90,9	16,56 16,78 16,78	$4p ^{1}D^{\circ} - 6s ^{3}D$ $4p ^{1}D^{\circ} - 6s ^{3}D$ $4p ^{3}D^{\circ} - 6s ^{3}D$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 1 - 2 \end{array} $
1636,61 1630,27	$\begin{array}{c} 10 \\ 25 \end{array}$	9,02 8,64	16.59 16.25	$\frac{4s^2}{4s^2} \frac{3F}{3F} - \frac{4p^{\text{V}}}{3F} \frac{3P^{\circ}}{4s^2}$	$\begin{array}{c} 2-2 \\ 4-3 \end{array}$
1623 ,17 1622 ,44	30 40	8,64 9,02	16,28 16,66	$4s^2 {}^3F - 4p^{\text{IV} \cdot 5}D^{\text{c}} + 4s^2 {}^3F - 4p^{\text{V}} {}^3P^{\text{c}}$	4—3 2—1

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
1621,4256	60	8,92	16,56	$4p\ ^{1}F^{\circ}-6s\ ^{3}D \ 4p\ ^{1}F^{\circ}-6s\ ^{3}D \ 4p\ ^{1}P^{\circ}-6s\ ^{3}D$	3—3
1617,9151	2 0	8,92	16,58		3—2
1611,1180	1 0	9,12	16,82		1—1
1610,2964	15	8,86	16,56	$4p ^3D^{\circ}$ 6s 3D	2-3
1608,6396	25	9,12	16,83	$4p ^1P^{\circ}$ 6s 1D	1-2
1606,8338	40	8,86	16,58	$4p ^3D^{\circ}$ 6s 3D	2-2
1605,274	30	8,87	16,59	$4s^2 ^3F$ 4p $^{\rm V} ^3P^{\circ}$	3-2
1604,8474	20	9,09	16,82	$4p ^1D^{\circ}$ 6s 3D	2-1
1602,3882	40	9,09	16,83	$4p ^{1}D^{\circ}$ $-6s ^{1}D$	2-2
1602,250	15	9,02	16,75	$4s^{2} ^{3}F$ $-4p^{V} ^{3}D^{\circ}$	2-4
1598,4024	40	9,06	16,82	$4p ^{3}D^{\circ}$ $-6s ^{3}D$	1-1
1593,5557	60	8,78	16,56	$4p ^{3}D^{\circ}$ $-6s ^{3}D$	3-3
1590,1646	40	8,78	16,58	$4p ^{3}D^{\circ}$ $-6s ^{3}D$	3-2
1583,683	50	8,87	16,70	$4s^2 {}^3F - 4p^{\rm V} {}^3D^{\rm o}$	3-2
1582,849	10	9,12	16,96	$4p {}^1P^{\rm o} - 5d {}^3P$	1-1
1581,991	40	8,87	16,71	$4s^2 {}^3F - 4p' {}^3F^{\rm o}$	3-4
1580,628	30	9,02	16,86	$4s^2 {}^3F - 4f {}^3D^{\rm o}$	2-3
1580,025	15	9,02	16,86	$4s^2 {}^3F - 4f {}^3D^{\rm o}$	2-2
1579,492	30	9,02	16,87	$4s^2 {}^3F - 4f {}^3F^\circ$	$ \begin{array}{r} 2-3 \\ 1-2 \\ 1-1 \\ 2-3 \\ 2-3 \end{array} $
1575,349	5	9,12	16,99	$4p {}^1P^\circ - 5d {}^3D$	
1570,568	3	9,06	16,96	$4p {}^3D^\circ - 5d {}^3P$	
1570,035	2	9,09	16,99	$4p {}^1D^\circ - 5d {}^3F$	
1569,426	10	9,02	16,92	$4s^2 {}^3F - 4p' {}^3F^\circ$	
1569,2123 1566,4151 1565,9240 1563,189 1558,3446	10 40 40 5 30	8,66 8,92 8,66 9,06 8,86	16,56 16,83 16,58 16,99 16,82	$4p {}^{3}F^{\circ} - 6s {}^{3}D$ $4p {}^{1}F^{\circ} - 6s {}^{1}D$ $4p {}^{3}F^{\circ} - 6s {}^{3}D$ $4p {}^{3}D^{\circ} - 5d {}^{3}D$ $4p {}^{3}D^{\circ} - 6s {}^{3}D$	$ \begin{array}{r} 2 - 3 \\ 3 - 2 \\ 2 - 2 \\ 1 - 2 \\ 2 - 1 \end{array} $
1557,583	20	8,87	16,83	$4s^2 \ ^3F - 4p' \ ^3D^\circ \ 4s^2 \ ^3F - 4p' \ ^3G^\circ \ 4s^2 \ ^3F - 4p' \ ^3G^\circ \ 4s^2 \ ^3F - 4p' \ ^3G^\circ \ 4s^2 \ ^3F - 4p' \ ^3G^\circ$	3-3
1555,698	50	8,64	16,61		4-3
1555,134	40	8,87	16,84		3-4
1553,893	25	9,02	16,99		2-3
1552,641	50	8,64	16,63		4-5
1551,379 1550,644 1550,292 1547,950 1544,674	30 30 3 10 40	8,87 9,02 8,87 8,87 8,87	16,86 47,01 16,87 16,88 16,89	$4s^2$ 3F $-4f$ $^3D^\circ$ $4s^2$ 3F $-4p^{\rm V}$ $^1P^\circ$ $4s^2$ 3F $-4f$ $^3F^\circ$ $4s^2$ 3F $-4f$ $^3C^\circ$	3—3 2—1 3—3 3—4 3—4
1541,7031 1540,589 1540,3889 1540,231 1538,488	75 30 30 20 10	$\begin{array}{c} 8,52 \\ 8,87 \\ 8,78 \\ 9,02 \\ \{8,92 \\ 9,12 \end{array}$	16,56 16,92 16,83 17,07 16,97 17,18	$4p \ ^{3}F^{\circ} - 6s \ ^{3}D$ $4s^{2} \ ^{3}F - 4p' \ ^{3}F^{\circ}$ $4p \ ^{3}D^{\circ} - 6s \ ^{1}D$ $4s^{2} \ ^{3}F - 4p' \ ^{3}F^{\circ}$ $4p \ ^{1}F^{\circ} - 5d \ ^{3}D$ $4p \ ^{1}P^{\circ} - 5d \ ^{1}P$	4-3 3-3 3-2 2-2 3-3 1-1
1537,560	50	8,64	16,71	$4s^{2} {}^{3}F - 4p' {}^{3}F^{\circ}$	4-4
1535,515	45	8,92	16,99	$4p {}^{1}F^{\circ} - 5d {}^{3}F$	3-4
1535,0024	25	8,49	16,56	$4p {}^{3}F^{\circ} - 6s {}^{3}I)$	3-3
1533,976	25	9,02	17,40	$4s^{2} {}^{3}F - 4p' {}^{3}D^{\circ}$	2-1
1532,124	30	8,87	16,96	$4s^{2} {}^{3}F - 4p' {}^{3}D^{\circ}$	3-2
1531,8557 1528,782 1527,801 1526,969 1525,794	50 2 5 5 30	$ \left\{ \begin{array}{l} 8,49 \\ 9,02 \\ 8,86 \\ 9,02 \\ 9,02 \\ 9,06 \\ 9,02 \end{array} \right. $	16,58 17,11 16,96 17,13 17,13 17,18 17,14	$4p^{3}F^{\circ}$ — $6s^{3}D$ $4s^{2}^{3}F$ — $4f^{1}D^{\circ}$ $4p^{3}D^{\circ}$ — $5d^{3}P$ $4s^{2}^{3}F$ — $4f^{1}F^{\circ}$ $4s^{2}^{3}F$ — $4f^{3}F^{\circ}$ $4p^{3}D^{\circ}$ — $5d^{1}P$ $4s^{2}^{3}F$ — $4f^{3}G^{\circ}$	3-2 2-2 2-1 2-3 2-2 1-1 2-3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
1525,653	10	$\left\{\begin{array}{l} 8,87\\ 9,09\\ 9,12 \end{array}\right.$	16,99 17,22 17,25	$4s^2 {}^3F - 4p' {}^3G^{\circ}$ $4p {}^1D^{\circ} - 5d {}^3D$ $4p {}^1P^{\circ} - 5d {}^3F$	$ \begin{array}{c} 3 - 3 \\ 2 - 1 \\ 1 - 2 \end{array} $
1524,857	20	8,86	16,99	$4p ^3D^{\circ} - 5d ^3D$	2—2
1523,740	10	9,09	17,23	$4p ^1D^{\circ} - 5d ^1D$	2—2
1522 ,575 1520 ,543	15 20	$^{9,02}_{9,09}$	$17,16 \\ 17,25$	$\frac{4s^2}{4p} {}^{3}F - 4p {}^{VI} {}^{3}F^{\circ} - 5d {}^{1}F$	2—3 2—3
1519,8370	60	8,66	16,82	$4p\ ^{3}F^{\circ}-6s\ ^{3}D$	2-1
1519,4917	50	$\begin{array}{c} 19,06 \\ 8,42 \end{array}$	$17,22 \\ 16,58$	$4p \ ^3D^{\circ} - 5d \ ^3D 4p \ ^3P^{\circ} - 6s \ ^3D$	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
1517,930	10	9,06	17,23	$4p ^{3}D^{\circ} - 5d ^{1}D$	1-2
6312, 1517	20	8,66	16,83	$4p \ ^3F^{\circ} - 6s \ ^1D$	2-2
1517,162	10	8,78	16,95	$4p ^3D^{\circ} - 5d ^3P$	3—2
1516, 902 1514, 492	$\frac{5}{50}$	8,78 8,64	16,96 16,83	$4p\ ^3D^{\circ}-5d\ ^3G\ 4s^{2}\ ^3F-4p'\ ^3D^{\circ}$	3—4 4—3
1514,132	10	9,06	17,25	$4p ^3D^{\circ} - 5d ^3F$	1—2
1513,360	20	8,78	16,97	$4p ^3D^{\circ} - 5d ^3D$	3-3
1512,457	20	8,87	17,07	$4s^2 \ ^3F - 4p' \ ^3F^\circ$	3—2 4—4
$1512,174 \\ 1510,502$	$\frac{20}{35}$	$8,64 \\ 8,78$	16,84 $16,99$	$\frac{4s^2 \ ^3F-4p' \ ^3G^c}{4p \ ^3D^\circ-5d \ ^3F}$	4—4 3—4
1510,502 $1508,627$	30	8,64	16,86	$4s^2 {}^3F - 4f {}^3D^\circ$	4—3
1508,175	25	9,02	17,24	$4s^2 {}^3F - 4p^{\rm VI} {}^3F^{\circ}$	2—2
1505,848	õ	8,87	17,10	$4s^2 {}^3F - 4p^{\text{VI}} {}^3F^{\circ}$	3-4
1505,384	20	8,64	16,88	$4s^2 {}^3F - 4f {}^3F^{\circ}$	4—4
1504,755	$\frac{25}{45}$	8,64	16,88	$4s^2 {}^3F - 4f {}^3G^{\circ} \ 4s^2 {}^3F - 6p {}^3P^{\circ}$	4—5 2—1
368, 1503 333, 1501	15 10	$^{9,02}_{9,02}$	17,26 17,27	$4s^2 {}^3F - 6p {}^3F^{\circ}$	$\frac{2-1}{2-3}$
1499,510	10	8,87	17,14	$4s^2 {}^3F - 4f {}^1G^{\circ}$	$\bar{3}$ —4
1498,566	3	8,87	17,14	$4s^2 {}^3F - 4f {}^3G^\circ$	3-3
1496,6860	35	8,54	16,82	$4p ^3P^{\circ} - 6s ^3D$	0—1
1495,426	$\frac{25}{5}$	8,87 8,66	$17,16 \\ 16,96$	$\frac{1}{4}s^2 {}^3F - 4p^{\text{VI}} {}^3F^{\circ} - 5d {}^3P$	3—3 2—1
$1494,658 \\ 1493,359$	25	8,92	17,22	$4p {}^{1}F^{\circ} - 5d {}^{1}G$	$\bar{3}$ — $\tilde{4}$
1492,837	30	9,02	17 ,32	$4s^2 {}^3F - 6p {}^3D^{\circ}$	2-2
1492,684	10	9,12	17,43	$4p {}^{1}P^{\circ} - 5d {}^{1}S$ $4s^{2} {}^{3}F - 6p {}^{3}D^{\circ}$	$\begin{array}{c} 1 - 0 \\ 2 - 3 \end{array}$
1492,149	10	$^{9,02}_{18,23}$	17,32 $16,56$	$4p^{3}P^{\circ} - 6s^{3}D$	$\frac{2-3}{2-3}$
1488,6373	7 5	18,66	16,99	$4p\ ^3F$ — $5d\ ^3F$	2-3
1485,6777	40	$\left\{ \begin{array}{l} 8,23 \\ 8,49 \end{array} \right.$	16,58 16,83	$4p {}^{3}P^{\circ} - 6s {}^{3}D$ $4p {}^{3}F^{\circ} - 6s {}^{1}D$	$\begin{array}{c} 2-2 \\ 3-2 \end{array}$
1485,318	20	8,86	17,21	4p ³D°−5d ³G	2-3
1481,541	20	8,87	17,24	$4s^2 {}^3F - 4p^{\text{VI}} {}^3F^\circ$	3-2
1478,230	2	8,86	17,25	$4p ^3D^{\circ} - 5d ^3F$	2—2
1475,846	$\begin{array}{c} 30 \\ 20 \end{array}$	9,02 8,87	$17,42 \\ 17,27$	$\frac{4s^2}{4s^2}$ $\frac{3}{3}F$ $\frac{4p}{6p}$ $\frac{1}{3}F$	$ \begin{array}{c} 2-1 \\ 3-3 \end{array} $
1474,934	25	8,42	16,83	$4p \ ^{3}P^{\circ} - 6s \ ^{1}D$	1—2
1473,9788 1473,531	2.5 15	8,87	17,28	$4s^2 \ ^3F - 6p \ ^3F^c$	3-4
1472,399	20	00,00	$8,\!42$	$3d^{10} {}^{1}S - 4p {}^{3}P^{c}$	0—1 4—5
1470,697	$\frac{40}{15}$	$\substack{8,52\\8,78}$	16,95 $17,22$	$4p \ ^3F^{\circ} - 5d \ ^3G$ $4p \ ^3D^{\circ} - 5d \ ^1G$	3—4
1469,691 1466,751	5	8,87	17,32	$4s^2 {}^3F - 6p {}^3D^{\circ}$	3-2
1466,751	10	8,52	16,97	$4p$ $^3F^{\circ}$ —5 d 3D	4-3
1466,067	20	8,87	17,32	$4s^2 {}^3F - 6p {}^3D^{\circ} 4s^2 {}^3F - 4p {}^{VI} {}^3F^{\circ}$	3—3 4—4
1465,542	15	$^{8,64}_{68,49}$	$17,10 \\ 16,96$	$4s^{2} {}^{3}F - 4p {}^{4} {}^{3}F $ $4p {}^{3}F^{\circ} - 5cl {}^{3}G$	3-4
1463,771	50	8,52	16,99	$4p$ $^3F^{\circ}$ — $5d$ 3F	4—4
1461,556	15	8,42	16,90	$4p^{3}P^{\circ}-5d^{3}S$	1—1 2—1
1459,412	25	9,02	17,51	$4s^2 {}^3F - 6p {}^3D^c$	2— <u>1</u> 5
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I	E _H , eV	E _B , eV	Transition	J
30 10 3	8,49 8,49 8,64	16,99 16,99 17,16	4p 3F°—5d 3F 4p 3F°—5d 3D 4s ² 3F—4p VI 3F°	3—3 3—2 4—3
20 25 20 20 2	8,42 8,66 9,02 8,42 8,23	16,96 17,21 17,57 17,00 16,82	$4p\ ^3P^{\circ}-5d\ ^3P$ $4p\ ^3F^{\circ}-5d\ ^3G$ $4s^2\ ^3F-6p\ ^3F^{\circ}$ $4p\ ^3P^{\circ}-5d\ ^3D$ $4p\ ^3P^{\circ}-6s\ ^3D$	1—1 2—3 2—2 1—2 2—1
10 15 15 10 25	8,66 8,23 8,64 8,87 8,64	17,25 16,83 17,27 17,51 17,28	$4p\ ^3F^{\circ}$ -5d\ 3F $4p\ ^3P^{\circ}$ -6s\ 1D $4s^2\ ^3F$ -6p\ $^3F^{\circ}$ $4s^2\ ^3F$ -6p\ $^1F^{\circ}$ $4s^2\ ^3F$ -6p\ $^3F^{\circ}$	2—2 2—2 4—3 3—3 4—4
15 10 40 15 20	8,42 8,54 8,23 8,87 8,64	17,06 17,18 16,90 17,55 17,32	$4p \ ^{3}P^{\circ} - 5d \ ^{3}P$ $4p \ ^{3}P^{\circ} - 5d \ ^{1}P$ $4p \ ^{3}P^{\circ} - 5d \ ^{3}S$ $4s^{2} \ ^{3}F - 6p \ ^{1}D^{\circ}$ $4s^{2} \ ^{3}F - 6p \ ^{3}D^{\circ}$	1-0 0-1 2-1 3-2 4-3
10 25 5 2 25	8,54 8,23 8,23 8,49 8,23	17,22 16,95 16,96 17,22 16,97	$4p\ ^{3}P^{\circ}-5d\ ^{3}D$ $4p\ ^{3}P^{\circ}-5d\ ^{3}P$ $4p\ ^{3}P^{\circ}-5d\ ^{3}P$ $4p\ ^{3}F^{\circ}-5d\ ^{1}G$ $4p\ ^{3}P^{\circ}-5d\ ^{3}D$	0-1 $2-2$ $2-1$ $3-4$ $2-3$
10 2 15 15 3	8,42 8,42 8,42 9,12 9,09	17,18 17,22 17,23 17,96 17,95	$4p ^{3}P^{\circ} - 5d ^{1}P$ $4p ^{3}P^{\circ} - 5d ^{3}D$ $4p ^{3}P^{\circ} - 5d ^{1}D$ $4p ^{1}P^{\circ} - 7s ^{3}D$ $4p ^{1}D^{\circ} - 7s ^{3}D$	$ \begin{array}{c} 1 - 1 \\ 1 - 1 \\ 1 - 2 \\ 1 - 2 \\ 2 - 3 \end{array} $
10 10 3 20 2	8,64 9,06 8,23 8,92 8,92	17,51 17,96 17,27 17,95 17,96	$4s^2 ^3F - 6p ^1F^\circ$ $4p ^3D^\circ - 7s ^3D$ $4p ^3P^\circ - 5d ^1F$ $4p ^1F^\circ - 7s ^3D$ $4p ^1F^\circ - 7s ^3D$	4-3 1-2 2-3 3-3 3-2
25 5 20 5 20	0,00 9,12 8,86 9,09 9,09	9,06 18,22 17,96 18,21 18,22	$3d^{10} ^{1}S - 4p ^{3}D^{\circ} \ 4p ^{1}P^{\circ} - 7s ^{1}D \ 4p ^{3}D^{\circ} - 7s ^{3}D \ 4p ^{1}D^{\circ} - 7s ^{3}D \ 4p ^{1}D^{\circ} - 7s ^{1}D$	0-1 $1-2$ $2-2$ $2-1$ $2-2$
30 15 25 15 3	0,00 9,06 8,78 8,78 8,92	9,12 18,21 17,95 17,96 18,16	$3d^{10} ^{1}S-4p ^{1}P^{\circ} \ 4p ^{3}D^{\circ}-7s ^{3}D \ 4p ^{3}D^{\circ}-7s ^{3}D \ 4p ^{3}D^{\circ}-7s ^{3}D \ 4p ^{1}F^{\circ}-6d ^{3}D$	0-1 1-1 3-3 3-2 3-3
5 2 20 5 5 10	8,92 8,86 (8,92 (8,66 8,66 9,09 8,86	18,17 18,15 18,22 17,96 18,17 18,43	$4p ^{1}F^{\circ}-6d ^{3}F$ $4p ^{3}D^{\circ}-6d ^{3}P$ $4p ^{1}F^{\circ}-7s ^{1}D$ $4p ^{3}F^{\circ}-7s ^{3}D$ $4p ^{3}D^{\circ}-6d ^{3}F$ $4p ^{1}D^{\circ}-6d ^{1}F$ $4p ^{3}D^{\circ}-7s ^{3}D$ $4p ^{3}D^{\circ}-7s ^{3}D$	3-4 2-1 3-2 2-2 2-3 2-3 2-1
6 3 6 5 10	9,06 8,78 9,12 8,78 8,78	18,43 18,15 18,50 18,16 18,17	$4p \ ^3D^{\circ} - 6d \ ^3F$ $4p \ ^3D^{\circ} - 6d \ ^3P$ $4p \ ^1P^{\circ} - 6d \ ^1S$ $4p \ ^3D^{\circ} - 6d \ ^3D$ $4p \ ^3D^{\circ} - 6d \ ^3F$	2-2 1-2 3-2 1-0 3-3 3-4
15 15	8,52 8,78 8,49	17,95 18,22 17,95	4p 3P°-7s 3D 4p 3P°-7s 1D 4p 3F°-7s 3D	4—3 3—2 3—3
	30 10 3 20 25 20 20 2 10 15 10 40 15 20 25 10 25 25 10 25 25 20 30 15 30 20 30 30 30 30 30 30 30 30 30 30 30 30 30	30	30	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
1308,296	$\begin{array}{c} 30 \\ 5 \\ 2 \\ 2 \\ 10 \end{array}$	8,49	17,96	$4p\ ^3F^{\circ}$ — $7s\ ^3D$	3-2
1305,554		8,92	18,41	$4p\ ^1F^{\circ}$ — $6d\ ^1G$	3-4
1303,979		8,66	18,17	$4p\ ^3F^{\circ}$ — $6d\ ^3F$	2-3
1303,656		8,66	18,17	$4p\ ^3F^{\circ}$ — $6d\ ^3D$	2-2
1299,267		8,42	17,96	$4p\ ^3P^{\circ}$ — $7s\ ^3D$	1-2
1298,394	15	8,66	18,21	4p ³ F°—7s ³ D	2—1
1297,549	2	8,66	18,22	4p ³ F°—7s ¹ D	2—2
1287,464	15	8,52	18,15	4p ³ F°—6d ³ G	4—5
1284,868	8	8,52	18,17	4p ³ F°—6d ³ F	4—4
1282,450	15	8,49	18,15	4p ³ F°—6d ³ G	3—4
1281,458	8	8,54	18,22	$4p ^3P^{\circ} - 7s ^3D$ $4p ^3F^{\circ} - 6d ^3D$ $4p ^3F^{\circ} - 6d ^3F$ $4p ^3P^{\circ} - 7s ^3D$ $4p ^3P^{\circ} - 7s ^3D$	0—1
1281,098	3	8,49	18,16		3—3
1280,265	5	8,49	18,17		3—3
1275,570	30	8,23	17,95		2—3
1274,463	3	8,23	17,96		2—2
1274,069	3	8,49	18,22	$4p \ ^3F^{\circ} - 7s \ ^1D$ $4p \ ^3P^{\circ} - 6d \ ^3P$ $4p \ ^3F^{\circ} - 6d \ ^3G$ $4p \ ^3P^{\circ} - 6d \ ^3D$ $4p \ ^3P^{\circ} - 7s \ ^3D$	3-2
1273,704	2	8,42	18,15		1-1
1272,036	8	8,66	18,41		2-3
1271,326	2	8,42	18,17		1-2
1266,308	10	8,42	18,21		1-1
1265,504	15	8,42	18,22	4p ³ P°-7s ¹ D	$ \begin{array}{r} 1-2 \\ 1-0 \\ 2-1 \\ 2-2 \\ 2-3 \end{array} $
1262,928	3	8,42	18,24	4p ³ P°-6d ³ P	
1253,179	5	8,23	18,13	4p ³ P°-6d ³ S	
1250,045	10	8,23	18,15	4p ³ P°-6d ³ P	
1248,790	5	8,23	18,16	4p ³ P°-6d ³ D	
1241,961	2	8,23	18,22	$4p ^3P^{\circ} - 7s ^1D$	2-2
1201,626	2	8,49	18,80	$4p ^3F^{\circ} - 7d ^3G$	3-4
1192,261	2	8,66	19,06	$4p ^3F^{\circ} - 7d ^3G$	2-3
1185,899	2	8,23	18,69	$4p ^3P^{\circ} - 8s ^3D$	2-3
1162,610	3	2,72	13,38	$4s ^3D - 4p' ^5D^{\circ}$	3-4
1157,871	8	2,98	13,68	4s ³ D-4p' ⁵ D°	1-2
1157,021	5	2,83	13,55	4s ³ D-4p' ⁵ D°	2-3
1147,762	8	2,98	13,78	4s ³ D-4p' ⁵ D°	1-1
1144,853	30	2,72	13,55	4s ³ D-4p' ⁵ D°	3-3
1142,642	20	2,83	13,68	4s ³ D-4p' ⁵ D°	2-2
1123,226 1119,945 1112,407 1106,446	5 15 5 3	$ \begin{array}{c} 2,83 \\ 2,72 \\ - \\ 3,26 \end{array} $	13,87 13,79 — 14,46	$\begin{array}{c} 4s\ ^{3}D-4p'\ ^{5}G^{\circ} \\ 4s\ ^{3}D-4p'\ ^{5}G^{\circ} \\ - \\ 4s\ ^{1}D-4p''\ ^{3}F^{\circ} \end{array}$	2—3 3—4 — 2—3
1105,445 1105,182 1097,049 1094,401 1091,288 1089,236 1088,393	5 25 30 5 3 20	2,98 2,83 2,72 2,83 3,26 3,26	14,19 14,13 14,05 14,19 14,64 14,65	$4s ^3D - 4p' ^5F^{\circ}$ $4s ^1D - 4p'' ^3D^{\circ}$ $4s ^1D - 4p'' ^3G^{\circ}$	1-2 2-3 3-4 2-2 2-1 2-3
1086,110	5	2,72	14,13	4s 3D-4p' 5F°	3-3
1073,738	30	1,98	14,52	4s 3D-4p" 3D°	1-2
1070,308	15	2,72	14,30	4s 3D-4p" 3G°	3-4
1069,193	50	2,83	14,43	4s 3D-4p" 3D°	2-3
1066,133	20	2,83	14,46	4s 3D-4p" 3F°	2-3
1065 ,7822 1063 ,003 1060 ,630 1059 ,0960 1058 ,796	60 60	3,26 2,98 2,83 3,26 2,72	14,89 14,64 14,52 14,96 14,43	$4s ^{1}D - 5p ^{3}P^{\circ}$ $4s ^{3}D - 4p '' ^{3}D^{\circ}$ $4s ^{3}D - 4p '' ^{3}D^{\circ}$ $4s ^{1}D - 5p ^{3}F^{\circ}$ $4s ^{3}D - 4p '' ^{3}D^{\circ}$	2-2 1-1 2-2 2-3 3-3
1056,9545	40	3,26	14,99	4s ¹ D-4p" ¹ D°	2-2
1055,795		2,72	14,46	4s ³ D-4p" ³ F°	3-3
1054,6903		3,26	15,01	4s ¹ D-4p" ¹ F°	2-3

					
λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
1052,170 1050,399	20 10	$^{2,98}_{2,72}$	14,76 14,52	4s ³ D-4p" ³ F° 4s ³ D-4p" ³ D°	1—2 3—2
1050,153 1049,7556 1049,363 1044,7434 1044,516	10 50 20 80 80	2,83 3,26 2,83 3,26 2,72	14,64 15,07 14,65 15,12 14,59	$4s ^3D - 4p'' ^3D^{\circ}$ $4s ^1D - 5p ^3D^{\circ}$ $4s ^3D - 4p'' ^3G^{\circ}$ $4s ^1D - 5p ^3D^{\circ}$ $4s ^3D - 4p'' ^3F^{\circ}$	2—1 2—3 2—3 2—2 3—4
1039,569 1039,345 1036,4695 1035,1631 1033,5679	60 60 60 8 10	2,83 2,72 3,26 3,26 3,26	14,76 14,65 15,22 15,23 15,25	$4s \ ^{3}D - 4p'' \ ^{3}F^{\circ}$ $4s \ ^{3}D - 4p'' \ ^{3}G^{\circ}$ $4s \ ^{1}D - 5p \ ^{3}F^{\circ}$ $4s \ ^{1}D - 5p \ ^{1}P^{\circ}$ $4s \ ^{1}D - 5p \ ^{1}F^{\circ}$	$ \begin{array}{r} 2-2 \\ 3-3 \\ 2-2 \\ 2-1 \\ 2-3 \end{array} $
1031,7661 1030,261 1029,747 1028,3281 1027,8312	8 20 10 25 50	2,98 2,72 2,72 2,83 3,26	14,99 14,75 14,76 14,89 15,32	$4s ^3D - 5p ^3P^{\circ}$ $4s ^3D - 4p '' ^1G^{\circ}$ $4s ^3D - 4p '' ^3F^{\circ}$ $4s ^3D - 5p ^3P^{\circ}$ $4s ^1D - 5p ^1D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 4 \\ 3 - 2 \\ 2 - 2 \\ 2 - 2 \end{array} $
1022,1021 1020,1075 1019,6545 1018,7075 1018,0643	5 15 15 50 15	2,83 2,83 2,83 2,72 { 2,83 2,98	14,96 14,99 14,99 14,89 15,01 15,15	$4s ^3D - 5p ^3F^{\circ}$ $4s ^3D - 4p'' ^1D^{\circ}$ $4s ^3D - 5p ^3P^{\circ}$ $4s ^3D - 5p ^3P^{\circ}$ $4s ^3D - 4p'' ^1F^{\circ}$ $4s ^3D - 5p ^3P^{\circ}$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 2-1 \\ 3-2 \\ 2-3 \\ 1-0 \end{array} $
1012,6834 1012,5972 1011,4362 1010,6395 1010,453	3 25 2 3 10	2,98 2,72 2,98 2,72 3,26	15,22 14,96 15,23 14,99 15,53	$4s ^3D - 5p ^3F^{\circ}$ $4s ^3D - 5p ^3F^{\circ}$ $4s ^3D - 5p ^1P^{\circ}$ $4s ^3D - 4p'' ^1D^{\circ}$ $4s ^1D - 4p''' ^3D^{\circ}$	1-2 3-3 1-1 3-2 2-3
1010,267 1008,7284 1008,5692 1004,0557 1001,0130	30 30 30 30 8	3,26 { 2,83 3,26 2,72 2,72 2,83	15,53 15,12 15,55 15,01 15,07 15,22	$4s ^{1}D - 4p''' ^{3}D^{\circ}$ $4s ^{3}D - 5p ^{3}D^{\circ}$ $4s ^{1}D - 4p''' ^{1}P^{\circ}$ $4s ^{3}D - 4p'' ^{1}F^{\circ}$ $4s ^{3}D - 5p ^{3}D^{\circ}$ $4s ^{3}D - 5p ^{3}F^{\circ}$	2-2 2-2 2-1 3-3 3-3 2-2
999,7944 998,3063 992,9533 989,2368 987,656 984,530 979,418 977,567 976,708 976,540	5 8 25 8 10 10 5 25 10	2,83 2,83 2,83 2,72 2,98 2,98 3,26 3,26 2,83 2,83	15,23 15,25 15,32 15,25 15,53 15,57 15,91 15,94 15,53 15,53	$4s ^3D - 5p ^1P^{\circ}$ $4s ^3D - 5p ^1F^{\circ}$ $4s ^3D - 5p ^1D^{\circ}$ $4s ^3D - 5p ^1F^{\circ}$ $4s ^3D - 4p''' ^3D^{\circ}$ $4s ^3D - 4p''' ^3D^{\circ}$ $4s ^1D - 4p ^{1V} ^5S^{\circ}$ $4s ^1D - 4p''' ^3F^{\circ}$ $4s ^3D - 4p''' ^3D^{\circ}$ $4s ^3D - 4p''' ^3D^{\circ}$	2-1 2-3 2-2 3-3 1-2 1-1 2-2 2-3 2-3 2-2
974,759 973,508 972,263 968,037 966,231 960,409 958,149 956,286 955,321 954,378	20 2 2 25 3 20 40 25 5 20	3,26 2,83 3,26 2,72 3,26 3,26 3,26 2,98 2,98 2,98 3,26 3,26	15,97 15,57 16,01 15,53 16,09 16,16 16,20 15,91 15,94 16,23 16,25	$4s ^{1}D - 4p^{\text{IV}} ^{5}P^{\circ}$ $4s ^{3}D - 4p^{\text{IV}} ^{5}P^{\circ}$ $4s ^{1}D - 4p^{\text{IV}} ^{5}P^{\circ}$ $4s ^{1}D - 4p^{\text{IV}} ^{3}P^{\circ}$ $4s ^{1}D - 4p^{\text{IV}} ^{1}D^{\circ}$ $4s ^{3}D - 4p^{\text{IV}} ^{5}S^{\circ}$ $4s ^{3}D - 4p^{\text{IV}} ^{5}D^{\circ}$ $4s ^{1}D - 4p^{\text{IV}} ^{5}D^{\circ}$	2—2 2—1 2—3 3—3 2—1 2—2 2—2 1—2 1—2 1—2 2—2, 1 2—3
951,413 947,700 945,976	5 2 50			$-\frac{1}{4s} \frac{1}{3}D - 4p^{\mathrm{IV}} \frac{5}{5}S^{\circ} \\ 4s \frac{3}{3}D - 4p''' \frac{3}{5}F^{\circ}$	_ 2—2 2—3

λ, λ	I	E _H , eV	E _B , eV	Transition	J
945,860	40	2,83	15,94	4s ³ D-4p''' ³ F°	2—2
945,524	60	2,98	16,09	$4s ^3D - 4p^{\mathrm{IV}} ^5P^{\circ}$	1—1
943,328	60	2,83	15,97	$4s ^3D$ — $4p^{\mathrm{IV}} ^5P^{\circ}$	2-2
939,522	10	2 , $\acute{7}2$	15,91	$4s ^3D - 4p^{1 \text{V}} ^5S^{\circ}$	3-2
937,814	5	$\frac{2}{72}$	15,94	4s ³ D-4p''' ³ F° 4s ³ D-4p''' ³ F°	3—3 3—4
935,892 935,35	$\frac{60}{20}$	$2,72 \\ 2,83$	15,97 16,09	4s 3D-4p IV 5P°	3—4 2—1
935,25	40	2,72	15,97	$4s ^3D - 4p^{\text{IV}} ^5P^{\circ}$	3—2
935,074	60	2,98	16,23	$\frac{4s}{3}D - 4p^{\text{IV}} \frac{5}{5}D^{\circ}$ $\frac{4s}{3}D - \frac{4p^{\text{IV}}}{5}P^{\circ}$	1-2, 1
932,940 929,897	$\frac{60}{5}$	$\begin{array}{c} 2,72 \\ 2,83 \end{array}$	16,01 16,16	$\frac{4s}{4s} \frac{3D-4p''}{3P^{\circ}}$	$\begin{array}{c} 3-3 \\ 2-2 \end{array}$
929,732	$\frac{3}{2}$	$\frac{2,03}{3,26}$	16,59	$4s^{1}D-4p^{V}^{3}P^{\circ}$	2-2
		∫ 2,83	16,23	$4s ^3D - 4p_{_{\rm IV}}^{\rm IV} ^5D^{\circ}$	2—2, 1
925,125	30	$\begin{cases} 2,03\\ 3,26 \end{cases}$	16,23	$4s D - 4p^{V} 3P^{\circ}$	2—2, 1 2—1
924,239	50	2,83	16,35 $16,25$	$4s ^3D - 4p''' ^1F^{\circ}$	$\frac{5}{2}$ $-\frac{1}{3}$
922,411	20	3,26	16,70	$4s^{1}D - 4p^{V} ^{3}D^{\circ}$	2—2
922,017	60	2,72	16,16	4s ³ D-4p''' ³ P°	3—2
917,303	20	2,72	16,23	$4s ^3D - 4p^{\text{IV}} ^5D^{\circ}$	3—2
914,209	80	2,72	16,28	$4s ^3D - 4p^{IV} ^5D^{\circ}$	3-3
912,414	3	3,26	16,84	$4s ^{1}D - 4f ^{3}P^{\circ}$	2—1
910,518	15	2,98	16,59	$4s ^3D - 4p ^{\text{V}} ^3P ^{\circ}$	1-2
906,109	4 0	2,98	16,66	$4s ^3D - 4p^{V} ^3P^{\circ} $ $4s ^3D - 4p^{V} ^3P^{\circ}$	1—1 2—2
901,071	60	2,83	16,59		
899,791	50	$\begin{cases} 2,98 \end{cases}$	16,75	$4s ^3D - 4p^{\text{V}} ^3D^{\circ}$	1-1
	15	$\begin{array}{c} 12,83 \\ 3,26 \end{array}$	16,61	$\frac{4s}{4s} \frac{^{3}D - 4p}{^{4}p} \frac{^{3}D^{\circ}}{^{3}F^{\circ}}$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$
897,790 896,970	40	$\frac{3,20}{2,98}$	17,07 16,80	$\frac{4s}{4s} \frac{D-4p}{3D-4p} \frac{1}{3P}$ °	1-0
896,753	60	2,83	16,66	$4s ^3D - 4p ^{\rm V} ^3P^{\circ}$	2—1
894,226	4 0	2,83	16,30 $16,70$	$4s ^3D - 4p^{\mathrm{V}} ^3D^{\circ}$	2-2
	80	2,72	16,59	$4s ^3D - 4p_{_{YY}}^{V} ^3P^{\circ}$	3—2
893,674	50	2,72 $2,72$	16,61	$4s D - 4p V 3D^{\circ}$ $4s 3D - 4p V 3D^{\circ}$	3-3
892,411 890,567	60	2,83	16,75	$4s ^3D - 4p_{_{Y}}^{V} ^3D^{\circ}$	2—1
886,946	60	$\frac{2}{72}$	16,70	$4s ^3D - 4p^{\mathrm{V}} ^3D^{\circ}$	3-2
886,515	10	$\frac{1}{2},98$	16,96	$4s ^3D - 4p' ^3D^{\circ}$	1-2
885,842	25	2,83	16,83	$4s ^3D - 4p' ^3D^{\circ}$	2—3
884,824	5	2,83	16,84	$4s ^3D - 4f ^3P^{\circ}$	$\begin{array}{c} 2-1 \\ 2-3 \end{array}$
884,430	8	3,26	17,27 16,86	$4s {}^{1}\!D - 6p {}^{3}\!F^{\circ} \ 4s {}^{3}\!D - 4p {}^{V} {}^{1}\!D^{\circ}$	$2-3 \\ 2-2$
884 ,127 883 ,837	$\begin{array}{c} 10 \\ 5 \end{array}$	2,83 2,83	16,86	$4s ^3D - 4f ^3D^{\circ}$	2—3 2—3
				4s ³ D-4p ^V ¹ P°	1—1
883,282 880,325	5 5	$^{2,98}_{2,83}$	17,01 $16,92$	$4s ^3D - 4p' ^3F^{\circ}$	2—3
906, 879	2	$^{2},98$	17,07	$4s ^3D - 4p' ^3F^{\circ}$	1-2
878,696	50	2,72	16,83	$\frac{4s}{4s} \frac{^{3}D - 4p'}{^{3}D} \frac{^{3}D}{^{3}D}$	3—3 1—1
877,839	15	2,98	17,10	-	2-2
877,559	20	2,83	16,96	$4s ^3D - 4p' ^3D^{\circ} \ 4s ^3D - 4p^{ m V} ^1D^{\circ}$	3—2 3—2
877,007 876,719	$\begin{array}{c} 25 \\ 20 \end{array}$	$\substack{2,72\\2,72}$	16,86 16,86	$4s ^3D - 4t ^3D^{\circ}$	3—3
873,264	15	$^{2},72$	16,92	$4s ^3D - 4p' ^3F^{\circ}$	3-3
871,064	8	2,83	17,07	$4s ^3D - 4p' ^3F^{\circ}$	2—2
870,544	8	2,72	16,96	$4s ^3D - 4p' ^3D^{\circ}$	3—2
869,336	25	2,98	17,24	$4s {}^{3}D - 4p {}^{V1} {}^{3}F^{\circ}$	1-2
869,062	10	2,83	17,10	$4s ^3D - 4D^{\prime} ^3D^{\circ}$	2—1 521
					574

. :		n aV	E 6V	Transition	J
λ. Å	I	E _H , eV	E _B , eV	Transmon	
867,726	8	2,98	17,26	$4s ^{3}D - 6p ^{3}P^{\circ}$	1-1
866,440	5	2,83	17,14	$4s ^3D-4f ^3G^{\circ}$	2—3
865,383	40	2,83	17,16	$4s ^{3}D - 4p^{VI} ^{3}F^{\circ}$	2-3 3-2
864 ,199	10	$\left\{\begin{array}{c} 2,72\\2,98 \end{array}\right.$	17,07 17,32	$\frac{4s}{4} \frac{^{3}D}{^{3}D} - \frac{^{4}p'}{4s} \frac{^{3}F}{^{3}D} \circ$	$\frac{3-2}{1-2}$
862,011	40	$\begin{array}{c} 2,72 \\ 2,83 \end{array}$	17,10 17,27	$\frac{4s}{4} \frac{^{3}D - 4p^{VI}}{4s} \frac{^{3}F^{\circ}}{^{3}F^{\circ}}$	3—4 2—3
858,482	25	2,98	17,42	$4s^{3}D-4p^{IV}$ 1°	1-1
		$l_{2,72}$	17,16	$4s ^3D - 4p^{\text{VI}} ^3F^{\circ}$	3-3
855,701	1 0	2,83	17,32	$4s ^3D - 6p ^3D^{\circ}$	2—2
855 ,474 852 ,898	5 3	$^{2,83}_{2,98}$	$17,32 \\ 17,51$	$4s ^3D - 6p ^3D^{\circ} $ $4s ^3D - 6p ^3D^{\circ}$	2—3 1—1
851,76	$\frac{3}{2}$	$\frac{2}{2}, \frac{30}{72}$	$17,31 \\ 17,27$	$4s ^3D - 6p ^3F^{\circ}$	3-3
851,300	25	2,72	17,28	$4s ^3D - 6p ^3F^{\circ}$	3-4
850,76	2	2,98	17,55	$4s ^3D - 6p ^1D^{\circ}$	1-2
849,354	3	2,98	17,57	$4s ^3D - 6p ^3F^{\circ}$	1-2
848,806	15	2,72	17,32	$4s ^3D - 6p ^3D^{\circ}$	$\begin{array}{c} 3 - 3 \\ 2 - 3 \end{array}$
844,910 844,616	$\frac{5}{3}$	$2,83 \\ 2,83$	51, 17 17, 51	$4s ^3D - 6p ^1F^{\circ} 4s ^3D - 6p ^3D^{\circ}$	2—3 2—1
842,483	3	$\frac{2,83}{2,83}$	17,55	$4s ^3D - 6p ^1D^{\circ}$	$\frac{2}{2}$ — $\frac{1}{2}$
841,105	2	2,83	17,57	$4s ^3D - 6p ^3F^{\circ}$	2—2
826,995	30	00,00	14,99	$3d^{10} {}^{1}S - 5p {}^{3}P^{\circ}$	0-1
823,800	2	2,83	17,88	$4s$ 3D — $4p$ $^{\mathrm{IV}}$ 3°	2-1
813,882	20	0,00	15,23	$3d^{10} {}^{1}S - 5p {}^{1}P^{\circ}$	0-1
810,997	1 5	0,00	15,29	$3d^{10} {}^{1}S - 5p {}^{3}D^{\circ}$	0-1
806,550	3	$^{3},^{26}$	18,63	$4s^{1}D - 4p^{VII}^{3}P^{\circ}$	2-2
797,452	10	0,00	15,55	$3d^{10} {}^{1}S - 4p''' {}^{1}P^{\circ}$ $4s {}^{3}D - 4p^{VII} {}^{3}P^{\circ}$	0-1
779,300	$\begin{array}{c} 8 \\ 25 \end{array}$	$\frac{2,72}{0,00}$	18,63 16,84	$\frac{4s}{3}D - 4p + 1 + 3p^{3}$ $3d^{10} + S - 4f + 3p^{3}$	$\begin{array}{c} 3-2 \\ 0-1 \end{array}$
736,031 735,519	$\frac{23}{20}$	0,00	16,84	$3d^{10} ^{1}S - 4f ^{1}P^{\circ}$	0-1
724,487	15	0,00	17,11	$3d^{10} {}^{1}S - 4f {}^{3}D^{\circ}$	0—1
718,171	10	0,00	17,26	$3d^{10} {}^{1}S - 6p {}^{3}P^{\circ}$	0-1
709,303	10	0,00	17,48	$3d^{10} {}^{1}S - 6p {}^{1}P^{\circ}$	0-1
685,396	2	00,00	18,09	$3d^{10} {}^{1}S - 5f {}^{3}P^{\circ}$	0-1
685,139 $675,601$	$\frac{8}{2}$	$00,00 \\ 00,0$	18,10 18,35	$3d^{10} {}^{1}S - 5f {}^{1}P^{\circ} \ 3d^{10} {}^{1}S - 5f {}^{3}D^{\circ}$	$0-1 \\ 0-1$
010,001	4	0,00	10,00	ow b of b	0 1

Cu III, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{9} {}^2D_{5/2}$ Ionization potential 297 100 cm⁻¹; 36,834 eV

λ, Å	I	$E_{ m H}^{},\;{ m eV}$	E _B , eV	Transition	J
822,05	1	11,04	15,43	$a~^2G$ — $z~^2G^\circ$	9/2-9/2
28 12,96	5	11,04	15,72	$a^{2}G$ — $z^{4}F^{\circ}$	9/2 - 7/2
2698,46	3	11,04	15,63	$a \ ^2G$ — $z \ ^2G^{\circ}$	$\frac{7}{2} - \frac{7}{2}$
2696,39	6	11,04	15,63	$a^{2}G-z^{2}G^{\circ}$	9/2 - 7/2
92, 643	40	11,04	15,72	$a^{2}G$ — $z^{2}F^{\circ}$	9/2 - 7/2
2641,54	8	11,04	1 5, 7 3	$a \ ^2G$ — $z \ ^2D^\circ$	$\frac{7}{2} - \frac{5}{2}$
2609,31	50	9,99	14,74	$a {}^{4}P$ — $z {}^{4}D$ $^{\circ}$	$\frac{5}{2}$ $\frac{7}{2}$
2522,36	25	11,04	15,95	$a^{2}G-z^{2}F^{\circ}$	$\frac{7}{2}$ $\frac{5}{2}$
2497 ,58	20	9,99	14,95	$a {}^{4}P - z {}^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$
2482 ,34	30	9,99	14,95	$a~^4P$ — $z~^4D$ $^\circ$	$\frac{3}{2}$ $\frac{5}{2}$
2438,47	25	9,67	14,74	$b~^2D$ — $z~^4D^\circ$	$\frac{5}{2}$ $\frac{7}{2}$
2412,32	15	9, 97	15,11	$a {}^{4}P - z {}^{4}D^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$

λ, Å	I	E _H , eV	EB, eV	Transition	J
2412,08 2405,49 2391,73	4 20 10	10,59 9,96 9,77	15,73 15,11 14,95	$a {}^{2}P - z {}^{2}D^{\circ} \\ a {}^{4}P - z {}^{4}D^{\circ} \\ b {}^{2}D - z {}^{4}D^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2368, 15 2363, 21 2361, 56 2346, 17 2320, 28	20 8 10 40 8	9,97 10,68 9,96 9,67 9,77	15,20 15,92 15,20 14,95 15,11	$a\ ^{4}P-z\ ^{4}D^{\circ}\ a\ ^{2}P-z\ ^{2}D^{\circ}\ a\ ^{4}P-z\ ^{4}D^{\circ}\ b\ ^{2}D-z\ ^{4}D^{\circ}\ b\ ^{2}D-z\ ^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2315,10 2312,31 2279,45 2277,43 2271,69	4 5 2 4 5	10,59 9,77 9,67 9,99	15,95 15,20 15,11 15,44	$\begin{array}{c} - \\ a \ ^{2}P-z \ ^{2}F^{\circ} \\ b \ ^{2}D-z \ ^{4}D^{\circ} \\ b \ ^{2}D-z \ ^{4}D^{\circ} \\ a \ ^{4}P-z \ ^{4}F^{\circ} \end{array}$	$ \begin{array}{c} - \\ 3/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 5/_2 - 3/_2 \\ 5/_2 - 7/_2 \end{array} $
2077,81 2043,37 2000,78 1928,715 1882,250	2 5 3 2 2	9,77 9,67 11,04 8,31 10,68	15,73 15,73 17,23 14,74 17,27	$b\ ^{2}D-z\ ^{2}D^{\circ}\ b\ ^{2}D-z\ ^{2}D^{\circ}\ a\ ^{2}G-y\ ^{2}F^{\circ}\ a\ ^{2}F-z\ ^{4}D^{\circ}\ a\ ^{2}P-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 9/2 - 7/2 \\ 7/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
1867,747 1858,685 1840,917 1826,339 1820,339	50 1 200 10 5	8,55 11,04 8,31 10,59	15,19 17,71 15,04 17,38	$a\ ^{2}F-z\ ^{4}G^{\circ}\ a\ ^{2}G-y\ ^{4}D^{\circ}\ a\ ^{2}F-z\ ^{4}G^{\circ}\ a\ ^{2}P-z\ ^{2}P^{\circ}\ -$	$ \begin{array}{c} 5/2 - 7/2 \\ 9/2 - 7/2 \\ 7/2 - 9/2 \\ 3/2 - 3/2 \\ - \end{array} $
1798,764 1787,902 1783,935 1783,799 1780,062	$5 \\ 1 \\ 5 \\ 20 \\ 5$	8,55 9,99 9,99 9,97 9,96	15,44 16,92 16,94 16,92 16,92	a ² F - z ⁴ F° a ⁴ P - z ⁴ P° a ⁴ P - z ⁴ P° a ⁴ P - z ⁴ P° a ⁴ P - z ⁴ P°	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
1776 ,136 1773 ,697 1772 ,478 1768 ,869 1766 ,219	20 1 2 200 2	$\begin{array}{c} 9,96 \\ 10,68 \\ 8,55 \\ 10,68 \\ 8,31 \\ 9,97 \end{array}$	16,94 17,67 15,54 17,67 15,32 16,99	$a\ ^{4}P-z\ ^{4}P^{\circ}$ $a\ ^{2}P-y\ ^{4}D^{\circ}$ $a\ ^{2}F-z\ ^{4}F^{\circ}$ $a\ ^{2}P-y\ ^{4}D^{\circ}$ $a\ ^{2}F-z\ ^{4}F^{\circ}$ $a\ ^{2}F-z\ ^{4}F^{\circ}$ $a\ ^{4}P-z\ ^{4}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 7/2 - 9/2 \\ 1/2 - 1/2 \end{array} $
1762 ,557 1761 ,155 1760 ,586 1755 ,012 1750 ,391	30 20 10 20 500	9,96 8,55 7,69 10,59 8,55	16,99 15,59 14,74 17,66 15,63	$a {}^{4}P - z {}^{4}P^{\circ}$ $a {}^{2}F - z {}^{4}F^{\circ}$ $a {}^{4}F - z {}^{4}D^{\circ}$ $a {}^{2}P - y {}^{4}D^{\circ}$ $a {}^{2}F - z {}^{2}G^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
1741 ,378 1741 ,135 1739 ,508 1738 ,648 1738 ,145	500 30 300 10 30	8,31 7,83 11,04 11,04 9,99	15,43 14,95 18,17 18,17 17,12	$a^{2}F - z^{2}G^{\circ}$ $a^{4}F - z^{4}D^{\circ}$ $a^{2}G - z^{2}H^{\circ}$ $a^{2}G - z^{2}H^{\circ}$ $a^{4}P - y^{2}F^{\circ}$	$ 7/_{2} - 9/_{2} $ $ 5/_{2} - 5/_{2} $ $ 7/_{2} - 9/_{2} $ $ 9/_{2} - 9/_{2} $ $ 5/_{2} - 5/_{2} $
1737 ,893 1732 ,998 1728 ,139 1726 ,275 1724 ,810	30 5 200 5 10	8,31 9,77 8,55 8,55 7,92	15,44 16,92 15,72 15,73 15,11	$a {}^{2}F - z {}^{4}F^{\circ}$ $b {}^{2}D - z {}^{4}P^{\circ}$ $a {}^{2}F - z {}^{2}F^{\circ}$ $a {}^{2}F - z {}^{2}D^{\circ}$ $a {}^{4}F - z {}^{4}D^{\circ}$	7/2 - 7/2 $3/2 - 3/2$ $5/2 - 7/2$ $5/2 - 5/2$ $3/2 - 3/2$
1722 ,379 1747 ,134 1716 ,400 1713 ,346 1711 .437	1000 5 10 5 30	7,54 - 9,77 8,31 9,99	14,74 16,99 15,54 17,23	$a {}^{4}F - z {}^{4}D^{\circ}$ $ b {}^{2}D - z {}^{4}P^{\circ}$ $a {}^{2}F - z {}^{4}F^{\circ}$ $a {}^{4}P - y {}^{2}F^{\circ}$	$ \begin{array}{c} 9/2 - 7/2 \\ - \\ 3/2 - 1/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
1711,257 1709,036 1708,958 1707,500 1705,633	200	9,99 7,69 9,67 9,97 11,04	17,23 14,95 16,92 17,23 18,30	$a {}^{4}P - y {}^{2}D^{\circ}$ $a {}^{4}F - z {}^{4}D^{\circ}$ $b {}^{2}D - z {}^{4}P^{\circ}$ $a {}^{4}P - y {}^{2}D^{\circ}$ $a {}^{2}G - z {}^{2}II^{\circ}$	$\begin{array}{c} \frac{3}{2} - \frac{3}{2} \\ \frac{7}{2} - \frac{5}{2} \\ \frac{5}{2} - \frac{3}{2} \\ \frac{1}{2} - \frac{3}{2} \\ \frac{9}{2} - \frac{11}{2} \end{array}$

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	λ, Å	I	E _H , eV	E _B , eV	Transition	J
	1705,333 1704,072 1702,994 1702,349 1702,190	300 10 500 30 300	9,67 9,96 7,83 10,68 10,59	16,94 17,23 15,11 17,96 17,88	$b^{2}D-z^{4}P^{\circ} \ a^{4}P-y^{2}D^{\circ} \ a^{4}F-z^{4}D^{\circ} \ a^{2}P-x^{2}D^{\circ} \ a^{2}P-x^{2}D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
	1702,102 1701,023 1696,202 1692,706 1689,051	400 400 15 300 200	7,92 11,04 9,96 8,31 9,99	15,20 18,32 17,27 15,63 17,33	$a\ {}^{4}F-z\ {}^{4}D^{\circ}\ a\ {}^{2}G-x\ {}^{2}F^{\circ}\ a\ {}^{4}P-z\ {}^{2}P^{\circ}\ a\ {}^{2}F-z\ {}^{2}G^{\circ}\ a\ {}^{4}P-y\ {}^{2}D^{\circ}$	$\begin{array}{c} 3/2 - 1/2 \\ 9/2 - 7/2 \\ 3/2 - 1/2 \\ 7/2 - 7/2 \\ 5/2 - 5/2 \end{array}$
	1688,618 1687,134 1686,214 1684,642 1682,695	100 600 300 500 30	10,68 7,69 9,77 7,83 10,59	18,02 15,04 17,12 15,19 17,96	$a\ ^{2}P-y\ ^{2}P^{\circ}\ a\ ^{4}F-z\ ^{4}G^{\circ}\ b\ ^{2}D-y\ ^{2}F^{\circ}\ a\ ^{4}F-z\ ^{4}G^{\circ}\ a\ ^{2}P-x\ ^{2}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \end{array} $
	1682,044 1681,481 1679,151 1677,373 1676,469	10 300 400 200 15	9,96 8,55 7,92 11,04 9,99	17,33 15,92 15,30 18,43 17,38	$a\ ^{4}P-y\ ^{2}D^{\circ} \ a\ ^{2}F-z\ ^{2}D^{\circ} \ a\ ^{4}F-z\ ^{4}G^{\circ} \ a\ ^{2}G-x\ ^{2}F^{\circ} \ a\ ^{4}P-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
	1674,602 1671,886 1670,140 1669,273 1660,887	500 500 500 10 30	8,55 8,31 8,31 10,59 9,77	15,95 15,72 15,73 18,02 17,23	$a\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{2}F-z\ ^{2}D^{\circ}\ a\ ^{2}P-y\ ^{2}P^{\circ}\ b\ ^{2}D-y\ ^{2}D^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
	1658,472 1654,574 1653,399 1652,010 1651,758	200 300 10 300 15	7,83 7,69 9,77 7,54 10,68	15,30 15,19 17,27 15,04 18,18	$a\ ^4F-z\ ^4G^{\circ}\ a\ ^4F-z\ ^4G^{\circ}\ b\ ^2D-z\ ^2P^{\circ}\ a\ ^4F-z\ ^4G^{\circ}\ a\ ^2P-y\ ^2P^{\circ}$	$\begin{array}{c} 5/_2 - 5/_2 \\ 7/_2 - 7/_2 \\ 3/_2 - 1/_2 \\ 9/_2 - 9/_2 \\ 1/_2 - 1/_2 \end{array}$
	1642,208 1639,960 1638,956 1633,192 1629,301	2000 10 300 1 1	7,54 9,77 9,67 10,59 7,69	15,09 17,33 17,23 18,18 15,30	$a\ ^4F-z\ ^4G^\circ \ b\ ^2D-y\ ^2D^\circ \ b\ ^2D-y\ ^2F^\circ \ a\ ^2P-y\ ^2P^\circ \ a\ ^4F-z\ ^4G^\circ$	$\begin{array}{c} 9/2 - 11/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 1/2 \\ 7/2 - 5/2 \end{array}$
	1628,295 1628,088 1626,411 1626,139 1625,500	300 50 200 200 1	7,83 9,77 7,69 7,92 10,68	15,44 17,38 15,32 15,54 18,31	$a\ ^4F - z\ ^4F^\circ \ b\ ^2D - z\ ^2P^\circ \ a\ ^4F - z\ ^4F^\circ \ a\ ^4F - z\ ^4F^\circ \ a\ ^2P - z\ ^2S^\circ$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 7/2 - 9/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
	1621,723 1620,776 1618,408 1616,607 1616,160	3 1 5 300 15	8,31 7,54 9,67 7,92 9,99	15,95 15,19 17,33 15,59 17,66	$a\ ^{2}F-z\ ^{2}F^{\circ}\ a\ ^{4}F-z\ ^{4}G^{\circ}\ b\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{4}F-z\ ^{4}F^{\circ}\ a\ ^{4}P-y\ ^{4}D^{\circ}$	7/2 - 5/2 $9/2 - 7/2$ $5/2 - 5/2$ $3/2 - 3/2$ $5/2 - 5/2$
	1610,571 1609,757 1609,599 1607,542 1606,837	75 100 50 100 {	9,97 9,96 9,97 9,96 10,59 9,67	17,67 17,66 17,67 17,67 18,31 17,38	$a\ ^{4}P-y\ ^{4}D^{\circ}$ $a\ ^{2}P-z\ ^{2}S^{\circ}$ $b\ ^{2}D-z\ ^{2}P^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
	1606,730 1605,969 1603,146 1600,194 1597,418	300 300 400 500 10	7,83 9,99 7,69 7,69 7,83	15,54 17,71 15,43 15,44 15,59	a ⁴ F — z ⁴ F° a ⁴ P — y ⁴ D° a ⁴ F — z ² G° a ⁴ F — z ⁴ F° a ⁴ F — z ⁴ F°	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 7/2 \\ 7/2 - 9/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \end{array} $
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λ, Å	I	E _H , eV	$E_{ m B}$, eV	Transition	
1593,758 1588,551 1579,353 1571,390 1571,154	1000 3 15 1	7,54 7,83 7,69 7,54 9,77	15,32 15,63 15,54 15,43 17,66	$a\ ^{4}F-z\ ^{4}F^{\circ}\ a\ ^{4}F-z\ ^{2}G^{\circ}\ a\ ^{4}F-z\ ^{4}F^{\circ}\ a\ ^{4}F-z\ ^{2}G^{\circ}\ b\ ^{2}D-y\ ^{4}D^{\circ}$	$ \begin{array}{c} 9/2 - 9/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \\ 9/2 - 9/2 \\ 3/2 - 5/2 \end{array} $
1570 ,202 1568 ,655 1568 ,564 1565 ,194 1561 ,790	30 2 2 5 3	7,83 7,83 7,54 9,96 7,69	15,72 15,73 15,44 17,88 15,63	$a\ {}^4F - z\ {}^2F^\circ \ a\ {}^4F - z\ {}^2D^\circ \ a\ {}^4F - z\ {}^4F^\circ \ a\ {}^4P - x\ {}^2D^\circ \ a\ {}^4F - z\ {}^2G^\circ$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 9/2 - 7/2 \\ 3/2 - 5/2 \\ 7/2 - 7/2 \end{array} $
1549,203 1548,867 1544,110 1544,062 1543,438	10 300 2 2 500	7,92 11,04 11,04 7,69 11,04	15,92 19,04 19,07 15,72 19,07	$a\ ^{4}F$ — $z\ ^{2}D^{\circ}$ $a\ ^{2}G$ — $y\ ^{2}G^{\circ}$ $a\ ^{2}G$ — $y\ ^{2}G^{\circ}$ $a\ ^{4}F$ — $z\ ^{2}F^{\circ}$ $a\ ^{2}G$ — $y\ ^{2}G^{\circ}$	3/2 - 3/2 $7/2 - 7/2$ $7/2 - 9/2$ $7/2 - 9/2$ $9/2 - 9/2$
1543,180 1542,562 1541,970 1531,588 1522,580	$\begin{array}{c} 2 \\ 2 \\ 40 \\ 1 \\ 15 \end{array}$	9,99 7,69 9,67 7,83	18,02 15,73 17,71 15,92	$a\ ^{4}P-y\ ^{2}P^{\circ}$ $a\ ^{4}F-z\ ^{2}D^{\circ}$ $b\ ^{2}D-y\ ^{4}D^{\circ}$ $a\ ^{4}F-z\ ^{2}D^{\circ}$ $-$	$ \begin{array}{c} 5/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \\ 5/2 - 3/2 \\ - \end{array} $
1520,546 1502,107 1486,904 1486,659 1484,010	$20 \\ 1 \\ 10 \\ 25 \\ 5$	9,77 9,99 9,99 9,67	18,02 18,32 18,33 18,02	$b^{2}D-y^{2}P^{\circ} \ a^{4}P-x^{2}F^{\circ} \ a^{4}P-z^{4}S^{\circ} \ b^{2}D-y^{2}P^{\circ}$	$ \begin{array}{c}$
1483,831 1481,243 1460,915 1458,021 1455,200	15 20 10 6 3	9,97 9,96 15,73 — 15,95	18,33 18,33 24,22 — 24,47	$a {}^{4}P - z {}^{4}S^{\circ}$ $a {}^{4}P - z {}^{4}S^{\circ}$ $z {}^{2}D^{\circ} - 5$ $z {}^{2}F^{\circ} - e {}^{2}F$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ - 5/_{2} - 5/_{2} \end{array} $
1451,478 1450,165 1444,692 1440,446 1437,645	1 3 1 3 3	15,73 15,72 15,95 15,63 15,44	24,27 24,27 24,53 24,24 24,07	$z^{2}D^{\circ}-e^{2}F$ $z^{2}F^{\circ}-e^{2}F$ $z^{2}F^{\circ}-9$ $z^{2}G^{\circ}-6$ $z^{4}F^{\circ}-e^{4}F$	$\begin{array}{c} 5/_{2} - 7/_{2} \\ 7/_{2} - 7/_{2} \\ 5/_{2} - 3/_{2}, 5/_{2} \\ 7/_{2} - 7/_{2}, 9/_{2} \\ 7/_{2} - 7/_{2} \end{array}$
1436,994 1436,376 1432,275 1431,901 1431,671	15 1 3 3 10	15,43 15,95 15,32 9,67 9,67	24,06 24,58 23,97 18,32 18,33	$z {}^{2}G^{\circ} - 3$ $z {}^{2}F^{\circ} - 10$ $z {}^{4}F^{\circ} - e {}^{4}F$ $b {}^{2}D - x {}^{2}F^{\circ}$ $b {}^{2}D - z {}^{4}S^{\circ}$	9/2 - 7/2, 9/2 $5/2 - 7/2$ $9/2 - 9/2$ $5/2 - 7/2$ $5/2 - 7/2$ $5/2 - 3/2$
1430,969 1430,373 1429,201 1428,081 1425,282	3 3 5 5 1	9,77 15,72 15,32 8,55 15,73	18,43 24,39 23,99 17,23 24,43	$\begin{array}{c} b \ ^{2}D - x \ ^{2}F^{\circ} \\ z \ ^{2}F^{\circ} - 7 \\ z \ ^{4}F^{\circ} - 1 \\ a \ ^{2}F - y \ ^{2}D^{\circ} \\ z \ ^{2}D^{\circ} - 8 \end{array}$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{7}{2} - \frac{5}{2} $ $ \frac{9}{2} - \frac{7}{2} $ $ \frac{9}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{5}{2} $
1425,079 1424,020 1423,504 1418,811 1417,538	2 5 10 5 10	15,54 15,72 ————————————————————————————————————	24,24 24,43 — 24,47 24,06 24,47	$ \begin{array}{ccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1417,124 1417,060 1415,478 1414,431 1412,794	2 2 1 3 5	15,32 15,72 15,63 15,59 15,32	24,07 24,47 24,39 24,35 24,09	$z^{4}F^{\circ}-e^{4}F$ $z^{2}F^{\circ}-e^{2}F$ $z^{2}G^{\circ}-7$ $z^{4}F^{\circ}-e^{4}F$ $z^{4}F^{\circ}-e^{4}G$	$ \begin{array}{c} 9/2 - 7/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 9/2 - 11/2 \end{array} $

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
1412,724 1409,248 1408,536 1408,310	5 1 1 1	15,44 { 15,44 15,63 15,44 15,73	24,22 24,24 24,43 24,24 24,53	$z^{4}F^{\circ}-5$ $z^{4}F^{\circ}-6$ $z^{2}G^{\circ}-8$ $z^{4}F^{\circ}-e^{4}F$ $z^{2}D^{\circ}-9$ $z^{4}F^{\circ}-e^{4}F$	7/2 - 7/2 $7/2 - 7/2$ $7/2 - 7/2$ $9/2$ $7/2 - 5/2$ $7/2 - 5/2$ $5/2 - 3/2$ $5/2$
1407,196 1407,139 1403,763 1403,181 1402,917 1402,435	3 5 1 40 1 3	15,54 8,31 8,55 — 15,63 15,63	24,35 17,12 17,38 — 24,47 24,47	$z^{2}F^{2}-e^{2}F$ $a^{2}F-y^{2}F^{\circ}$ $a^{2}F-z^{2}P^{\circ}$ $ z^{2}G^{\circ}-f^{2}F$ $z^{2}G^{\circ}-e^{2}F$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
1402,250 1401,655 1401,602 1401,376 1399,190	5 5 5 2 5	15,43 15,54 15,72	24,27 24,39 24,58	$z {}^{2}G^{\circ} - e^{2}F$ $z {}^{4}F^{\circ} - 7$ $z {}^{2}F^{\circ} - 10$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1398,379 1396,417 1395,274 1390,306	5 1 10 10	15,32 15,19 15,09	24,18 24,07 23,97	$z {}^{4}F^{\circ} - 4$ $z {}^{4}G^{\circ} - e {}^{4}F$ $z {}^{4}G^{\circ} - e {}^{4}F$	$\begin{array}{c} 9/2 - 7/2, & 9/2 \\ 7/2 - 7/2 & 7/2 \\ 11/2 - 9/2 \end{array}$
1389,528	5	$\left\{\begin{array}{c}8,31\\15,32\end{array}\right.$	17,23 24,24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{9}{2}$ $\frac{7}{2}$ $\frac{9}{2}$
1388,276 1386,714 1385,921 1385,380 1384,929	1 1 3 1 3	15,04 15,30 15,59 { 15,04 15,44 15,63	23,97 24,24 24,53 23,99 24,39 24,58	$z {}^{4}G^{\circ} - e {}^{4}F$ $z {}^{4}G^{\circ} - e {}^{4}F$ $z {}^{4}F^{\circ} - 9$ $z {}^{4}G^{\circ} - 1$ $z {}^{4}F^{\circ} - 7$ $z {}^{2}G^{\circ} - 10$	$\begin{array}{c} 9/2 - 9/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2, 5/2 \\ 9/2 - 7/2, 9/2 \\ \hline 7/2 - 5/2 \\ 7/2 - 7/2 \end{array}$
1384,840 1384,324 1382,561 1379,379 1378,238	5 5 4 1	15,32 - 15,44 15,19	24,27 	$z {}^{4}F^{\circ} - e {}^{2}F$ $- z {}^{4}F^{\circ} - 8$ $z {}^{4}G^{\circ} - 4$	$\begin{array}{c} - \\ 9/2 - 7/2 \\ - \\ 7/2 - 5/2, 7/2 \\ 7/2 - 7/2, 9/2 \end{array}$
1377,504 1376,807 1375,621 1374,758 1374,033	30 30 5 3	15,09 15,04 8,31 15,04	24,09 24,06 17,33 24,07	$z^{4}G^{\circ}-e^{4}G$ $z^{4}G^{\circ}-3$ $a^{2}F-y^{2}D^{\circ}$ $z^{4}G^{\circ}-e^{4}F$	$\begin{array}{c}$
1372,899 1371,144 1369,988 1369,612 1368,923	5 10 1 5 2	15,49 15,43 15,04 15,19 15,19	24,22 24,47 24,09 24,24 24,24	$z^{4}G^{\circ}-5$ $z^{2}G^{\circ}-f^{2}F$ $z^{4}G^{\circ}-e^{4}G$ $z^{4}G^{\circ}-6$ $z^{4}G^{\circ}-e^{4}F$	7/2 - 7/2 $9/2 - 7/2$ $9/2 - 11/2$ $7/2 - 7/2$, $9/2$ $7/2 - 5/2$
1367,646 1358,440 1356,424 1353,964 1351,271	5 2 5 2 3	15,30 15,04 15,43 15,04	24,43 24,18 24,58 24,22	$z {}^{4}G^{\circ} - 8$ $z {}^{4}G^{\circ} - 4$ $z {}^{2}G^{\circ} - 10$ $z {}^{4}G^{\circ} - 5$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
1349,441 1348,077 1347,048 1346,062 1343,730	5 1 3 5 5	15,04 15,19 —	24,24 24,39 —	z ⁴ G°—6 z ⁴ G°—7 —	9/2—7/2, 9/2 7/2—5/2 —
1343,032 1342,193 1339,497 1337,572 1332,985	2 3 5 5 15	15,30 14,74 14,74 —	24,53 23,97 23,99 —	z ⁴ G°—9 z ⁴ D°—e ⁴ F z ⁴ D°—1 —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
1330,365 1327,178 1324,033 1318,582 1316,143	2 5 5 2 5	14,74 — 7,83	24,06 — 17,23 —	z ⁴ D°—3 — — — — — 2 ² F° —	$^{7/2}_{-}^{-7/2}, ^{9/2}_{-}$ $^{-}_{-}^{-}_{-}^{-7/2}$
1312,400 1307,595 1271,839 1271,234 1259,937	10 3 2 5 10	14,74 14,95 7,92 7,92 7,83	24,48 24,43 17,67 17,67 17,67	$z^{4}D^{\circ}-4$ $z^{4}D^{\circ}-8$ $a^{4}F-y^{4}D^{\circ}$ $a^{4}F-y^{4}D^{\circ}$ $a^{4}F-y^{4}D^{\circ}$	$^{7/2}_{2}$, $^{9/2}_{2}$ $^{5/2}_{2}$, $^{5/2}_{2}$, $^{7/2}_{2}$ $^{3/2}_{2}$, $^{3/2}_{2}$ $^{3/2}_{2}$, $^{1/2}_{2}$ $^{5/2}$, $^{3/2}$
1254,717 1244,377 1238,325 1237,776 1219,290	3 10 1 3 5	8,55 7,69 7,69 8,31 7,54	18,43 17,66 17,71 18,32 17,71	$a^{2}F - x^{2}F^{\circ}$ $a^{4}F - y^{4}D^{\circ}$ $a^{4}F - y^{4}D^{\circ}$ $a^{2}F - x^{2}F^{\circ}$ $a^{4}F - y^{4}D^{\circ}$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$
829,343 808,583 802,841 801,154 797,566	5 20 150 200 100	0,00 0,26 0,00 0,26 0,00	14,95 15,59 15,44 15,73 15,54	$a \ ^{2}D - z \ ^{4}D^{\circ}$ $a \ ^{2}D - z \ ^{4}F^{\circ}$ $a \ ^{2}D - z \ ^{4}F^{\circ}$ $a \ ^{2}D - z \ ^{2}D^{\circ}$ $a \ ^{2}D - z \ ^{4}F^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
795,258 793,065 791,371 789,840 788,462	2 100 300 200 300	0,00 0,00 0,26 0,26 0,00	15,59 15,63 15,92 15,95 15,72	$a\ ^{2}D-z\ ^{4}F^{\circ}\ a\ ^{2}D-z\ ^{2}G^{\circ}\ a\ ^{2}D-z\ ^{2}D^{\circ}\ a\ ^{2}D-z\ ^{2}F^{\circ}\ a\ ^{2}D-z\ ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
788,073 778,603 777,125 743,970 743,303	400 50 200 30 20	$egin{array}{c} 0,00 \\ 0,00 \\ 0,00 \\ 0,26 \\ 0,26 \end{array}$	15,73 15,92 15,95 16,92 16,94	$\begin{array}{c} a \ ^{2}D - z \ ^{2}D^{\circ} \\ a \ ^{2}D - z \ ^{2}D^{\circ} \\ a \ ^{2}D - z \ ^{2}F^{\circ} \\ a \ ^{2}D - z \ ^{4}P^{\circ} \\ a \ ^{2}D - z \ ^{4}P^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
735, 224 732, 688 732, 026 730, 365 728, 906	100 5 100 150 2	$0,26 \\ 0,00 \\ 0,00 \\ 0,26 \\ 0,26$	17,12 16,92 16,94 17,23 17,27	$a\ ^{2}D-y\ ^{2}F^{\circ}\ a\ ^{2}D-z\ ^{4}P^{\circ}\ a\ ^{2}D-z\ ^{4}P^{\circ}\ a\ ^{2}D-y\ ^{2}D^{\circ}\ a\ ^{2}D-z\ ^{2}P^{\circ}$	3/2 $5/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $3/2$ $3/2$ $3/2$ $3/2$
726,295 723,958 719,506 715,530 713,262	10 20 150 200 10	$ 0,26 \\ 0,26 \\ 0,00 \\ 0,00 \\ 0,00 $	17,33 17,38 17,23 17,33 17,38	$egin{array}{l} a\ ^2D - y\ ^2D^\circ \ a\ ^2D - z\ ^2P^\circ \ a\ ^2D - y\ ^2F^\circ \ a\ ^2D - y\ ^2D^\circ \ a\ ^2D - z\ ^2P^\circ \end{array}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
712,473 712,040 711,834 703,622 702,112	15 5 3 15 20	0,26 0,26 0,26 0,26 0,00	17,66 17,67 17,67 17,88 17,66	$a\ ^{2}D-y\ ^{4}D^{\circ}\ a\ ^{2}D-y\ ^{4}D^{\circ}\ a\ ^{2}D-y\ ^{4}D^{\circ}\ a\ ^{2}D-x\ ^{2}D^{\circ}\ a\ ^{2}D-y\ ^{4}D^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
701,692 700,271 700,182 697,930 693,510	15 150 20 20 50	0,00 0,26 0,00 0,26 0,00	17,67 17,96 17,71 18,02 17,88	$egin{array}{l} a\ ^2D - y\ ^4D\ ^\circ \ a\ ^2D - x\ ^2D\ ^\circ \ a\ ^2D - y\ ^4D\ ^\circ \ a\ ^2D - y\ ^2P\ ^\circ \ a\ ^2D - x\ ^2D\ ^\circ \ \end{array}$	$ \begin{array}{r} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
691,557 690,250 687,987 686,903 682,471	100 75 100 15 200	0,26 $0,00$ $0,00$ $0,26$ $0,26$	18,18 17,96 18,02 18,31 18,43	$egin{array}{l} a\ ^2D - y\ ^2P^\circ \ a\ ^2D - x\ ^2D^\circ \ a\ ^2D - y\ ^2P^\circ \ a\ ^2D - z\ ^2S^\circ \ a\ ^2D - x\ ^2F^\circ \end{array}$	3/2 - 1/2 $5/2 - 3/2$ $5/2 - 3/2$ $5/2 - 3/2$ $3/2 - 1/2$ $3/2 - 5/2$
676,564 $672,659$	300 50	$0,00 \\ 0,00$	18,32 18,43	$a\ ^{2}D-x\ ^{2}F^{\circ}\ a\ ^{2}D-x\ ^{2}F^{\circ}$	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{5}{2}$ $\frac{-5}{2}$

λ, Å	I	Expected assignment	λ, Λ	I	Expected assignment
1411,69 476,201 472,347 467,106 464,824	30 20 20 15 20	Cu IV	324,607 324,485 323,816 322,617 312,505	50 70 60 15 20	
464,640 463,712 459,881 453,425 453,130	20 20 15 40 20		340,727 340,380 299,217 298,901	15 20 15 20	
452,654 451,152 450,015 448,420	30 25 25 25		282,440 281,744 281,492 278,128 274,601	20 40 50 20 15	
446,995 444,999 379,326 377,756	25 15 25 15		273,417 272,424 271,443 270,740	20 15 20 20	
361 ,838 361 ,220 360 ,618 359 ,873 358 ,865	15 25 30 50 90		270,298 269,653 269,044 268,773 268,309	30 20 40 50 60	
357 ,897 355 ,425 353 ,031 349 ,964 348 ,413	100 20 15 30 15		267,562 266,061 265,641 264,414 264,029	25 20 50 20 15	
347 ,854 346 ,004 345 ,368 342 ,713	30 60 90 80		263,760 262,938 262,442 261,806	30 30 20 20	
342,432 341,483 341,183 339,887	20 25 20 30		261,606 260,967 260,245 259,871	30 25 25 25	
339,420 338,314 336,279 335,919 335,470	15 25 25 25 25		259,558 259,199 258,927 258,265 258,004	20 20 80 45 15	
335,916 335,016 334,204 333,562 332,893	20 30 30 100		257,626 257,315 256,898	20 20 40	
329,851 329,805 329,047 328,831	$ \begin{array}{r} 30 \\ 30 \\ 100 \\ 20 \\ 40 \end{array} $		256,365 255,417 255,214 254,772	30 35 45 70	
328,737 328,536 328,412 327,620 327,383	25 50 20 15		254,510 253,786 253,465 253,083 252,780	50 15 15 15 75	
326,575 325,687 325,038	20 20 20		252,223 251,947 251,670	15 20 20	

λ, Å	I	Expected assignment	λ, Å	I	Expected assignment
251,278	20		209,648	30	
250,400	30		209,241	30	
249,415	1 5		208,902	60	
249,413	$\frac{13}{20}$	ľ	208,502	15	
248,426	50		207,925	$3\overline{5}$	
247,742	25		207,733	15	
241,583	1 5		207,282	20	
235,299	30		206,842	35	
225,497	2 5		206,355	60	
222,378	15		205,610	30	
217,743	20		205,278	60	
216,454	25		204,725	40	
216,063	50		204,056	1 5	
215,611	50		203,432	60	
214,206 211,707	20 20		203,010	60	
211,707	50		202,065	20	
•		,	201,615	20 15	
$210,612 \\ 210,217$	15 15		201,329	15	

KRYPTON, Z = 36

Kr I, ground state $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^{1_0}\,4s^2\,4p^{6\,1}S_0$ Ionization potential $112\,915,2$ cm⁻¹; 13,999 eV

		1	1		
λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
25233,78 24292,17 24260,45 23502,37 23340,44	70 38 28 17 65	11,55 12,35 11,53 12,26 12,28	12,04 12,86 12,04 12,78 12,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 1-0 \\ 1-1 \\ 2-2 \\ 3-2 \end{array} $
22485,79 21900,51 21165,46 20423,97 20419,00	38 2250 319 142 1	12,26 11,55 11,53 12,18 12,82	12,81 12,11 12,11 12,78 13,42	$\begin{array}{c} 4d \ [2^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-2 \\ 3-2 \\ 2-2 \end{array} $
20209,87 18797,59 18787,73 18785,45 18695,91	84 40 10 37 62	12,26 12,12 12,14 10,64 12,14	12,87 12,78 12,80 11,30 12,80	$\begin{array}{c} 5p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}] ^{\circ} \\ 4d \ [^{31}/_{2}] ^{\circ} - 6p \ [^{21}/_{2}] \\ 5p' \ [^{11}/_{2}] - 4d' \ [^{11}/_{2}] ^{\circ} \\ 5s' \ [^{1}/_{2}] ^{\circ} - 5p \ [^{1}/_{2}] \\ 5p' \ [^{1}/_{2}] - 4d' \ [^{11}/_{2}] ^{\circ} \end{array}$	$ \begin{array}{r} 0 - 1 \\ 4 - 3 \\ 2 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
18581,19 18418,82 18184,43 18167,12 18098,46	30 4 15 1500 10	11,44 12,11 12,14 11,44 12,14	12,11 12,78 12,82 12,12 12,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 2-2 \\ 3-4 \\ 1-2 \end{array} $
18001,71 17842,70 17770,21 17630,44 17616,57	400 270 4 4 37	11,67 11,30 12,11 12,10 12,11	12,35 12,00 12,81 12,80 12,82	$\begin{array}{c} 5p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ 5p' \ [^{1}/_{2}] - 4d' \ [^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \end{array}$	0-1 $1-0$ $2-1$ $1-2$ $2-2$
17404,67 17367,98 17230,21 17098,76 17070,04	32 360 10 300 10	11,55 12,14 12,04 12,10 12,14	12,26 12,86 12,76 12,82 12,87	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-1 \\ 1-2 \\ 2-1 \end{array} $
16994,36 16935,71 16896,58 16890,40 16853,45	10 800 700 1000 480	12,14 11,53 11,30 11,44 11,44	12,87 12,26 12,04 12,18 12,18	$\begin{array}{c} 5p' \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 4d \ [^{2}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 4d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 4d \ [^{3}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 4d \ [^{3}/_{2}]^{\circ} \end{array}$	1—1 1—2 1—1 2—3 3—3
16784,65 16726,48 16573,10 16465,29 16347,31	950 70 16 15 5	11,55 10,56 12,26 12,38 12,00	12,28 11,30 13,00 13,14 12,76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 0-1 0-1 1-2 0-1
16315,58 16109,46 16052,31 15925,64 15890,52	12 3 2 6 25	12,38 12,10 12,04 12,04 12,26	13,14 12,87 12,81 12,82 13,03	$\begin{array}{c} 6s \left[\frac{11}{2} \right]^{\circ} - 4f \left[\frac{21}{2} \right] \\ 5p' \left[\frac{11}{2} \right] - 5d \left[\frac{11}{2} \right]^{\circ} \\ 4d \left[\frac{11}{2} \right]^{\circ} - 6p \left[\frac{11}{2} \right] \\ 4d \left[\frac{11}{2} \right]^{\circ} - 6p \left[\frac{11}{2} \right] \\ 5p' \left[\frac{11}{2} \right] - 6s' \left[\frac{11}{2} \right]^{\circ} \end{array}$	1-2 1-1 1-1 1-2 0-1
15823,40 15820,10 15771,44 15680,94 15634,98	2 35 1 75 7	12,35 12,35 12,35 12,35 12,35 12,35	13,14 13,14 13,14 13,14 13,14	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \end{array}$	1-1 1-2 2-2 1-2 2-3
15474,02 15433,63 15371,89	65 4 350	10,64 12,10 11,55	11,44 12,90 12,35	$5s [1/2]^{\circ} -5p [2^{1}/2]$ $5p' [1^{1}/2] -5d [1/2]^{\circ}$ $5p [1^{1}/2] -6s [1^{1}/2]^{\circ}$	1—2 1—0 2—2

	I	E _H , eV	E _B , eV	Transition	J
15335 ,29 15326 ,87	850 35	11,30 11,55	12,11 12,35	$\begin{array}{c} 5p \ [^{1}/_{2}]-4d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}]-4d \ [^{1}/_{2}]^{\circ} \end{array}$	1—2 2—1
15239 ,85 15209 ,52 15005 ,57 14973 ,74 14961 ,76	900 42 25 8 110	11,44 11,44 11,53 12,04 11,53	12,26 12,26 12,35 12,86 12,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1 2-2 3-2 1-2 1-0 1-1
14765,64 14762,83 14734,46 14715,55 14469,33	230 250 900 2 30	11,55 11,44 11,44 12,26 12,28	12,38 12,28 12,28 13,10 13,14	$\begin{array}{c} 5p \ [4^{1}/_{2}] - 6s \ [4^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [4^{1}/_{2}] \end{array}$	2-1 2-3 3-3 0-1 3-4
14426,93 14402,58 14401,35 14347,82 14341,25	1100 80 30 400 9	11,53 12,28 12,28 12,14 12,28 12,14	12,38 13,14 13,14 13,00 13,15 13,01	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \end{array}$	1-1 3-3 3-2 2-1 3-3, 4 2-3
14156,62 14104,27 13974,15 13939,13 13924,00	15 40 70 85 270	12,14 12,14 12,26 12,14 12,26	13,02 13,02 13,14 13,03 13,15	$\begin{array}{c} 5p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 6s' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 2-2 \\ 1-0 \\ 2-3 \end{array} $
13882,64 13832,57 13800,03 13763,72 13738,86	240 50 3 6 400	12,14 12,14 12,14 12,14 10,64	13,03 13,03 13,04 13,04 11,55	$\begin{array}{c} 5p' \ [1^{1}/_{2}] - 6s' \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 6s' \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 5s' \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 1-2 \\ 2-3 \\ 1-2 \end{array} $
13711,23 13658,38 13634,22 13622,28 13337,52	100 360 1700 800 55	12,10 11,44 11,44 11,44 12,10	13,00 12,35 12,35 12,35 13,03	$\begin{array}{c} 5p' \ [1^{1}/_{2}]^{\circ} - 4d' \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 2 - 3 \\ 2 - 1 \\ 1 - 0 \end{array} $
13304,30 13240,52 13210,56 13177,38 13022,05	5 75 10 850 15	12,35 12,10 12,10 11,44 12,86	13,28 13,03 13,04 12,38 13,81	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} -7p \ [2^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] -6s' \ [^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] -5d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] -6s \ [1^{1}/_{2}]^{\circ} \\ 4d' \ [2^{1}/_{2}]^{\circ} -4f' \ [3^{1}/_{2}] \end{array}$	2-3 1-1 1-2 2-1 3-3, 4
12985,08 12977,98 12934,48 12879,00 12861,89	12 2 1 500 55	11,30 12,14 12,14 12,18 10,56	12,26 13,10 13,10 13,14 11,53	$\begin{array}{c} 5p \ [^{1}/_{2}] - 4d \ [2^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [4^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \end{array}$	1—2 2—1 1—1 3—4 0—1
12825,08 12782,39 12598,19 12321,48 12240,81	5 100 15 9 2	{ 12,18 12,18 12,18 12,82 12,80 12,28	13,14 13,14 13,15 13,81 13,81 13,29	$\begin{array}{c} 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 4d' \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 4d' \ [4^{1}/_{2}]^{\circ} - 4f' \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 7p \ [4^{1}/_{2}] \end{array}$	3-2 3-3 3-3, 4 2-3 2-3 3-2
12229,23 12204,39 12156,97 12123,47 12117,81	4 700 2 40 100	12,10 12,12 12,12 10,64 12,12	13,11 13,14 13,14 11,67 13,15	$\begin{array}{c} 5p' \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [4^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [2^{2}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \end{array}$	1-1 4-5 4-3 1-0 4-3, 4
12077,42 11997,08 11996,00	115 480 25	12,11 12,11 12,11	13,14 13,14 13,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-2 \\ 2-3 \\ 2-2 \end{array} $

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λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
11819,43 11 7 92,25	2000 120	11,30 11,30	12,35 12,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—2 1—1
11655,8 11611,6 11457,52 11339,44 11328,51	1 80 1 4	12,38 12,38 11,30 12,26 12,35	13,45 13,45 12,38 13,35 13,45	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 6s \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 4d \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-1 \\ 0-1 \\ 1-2 \end{array} $
11316,1 11303,8 11262,71 11259,16 11257,74	1 1 2 50 80	12,35 12,35 12,35 12,04 12,04	13,45 13,45 13,45 13,14 13,14	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 2 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
11214,58 11187,13 10874,92 10729,43 10699,33	5 40 100 2 20	12,18 12,04 12,00 12,11 12,12	13,28 13,14 13,14 13,27 13,28	$\begin{array}{c} 4d \ [3^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 4d \ [^{3}/_{2}]^{\circ} - 7p \ [^{2^{1}}/_{2}] \end{array}$	3-2, 3 1-2 0-1 2-1 4-3
10647,63 10626,70 10608,43 10593,01 10575,50	$\begin{array}{c} 1 \\ 8 \\ 20 \\ 100 \\ 2 \end{array}$	12,28 12,28 12,28 12,28 12,11	13,45 13,45 13,45 13,45 13,28	$\begin{array}{c} 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \end{array}$	3-2 $ 3-4 $ $ 3-2 $ $ 3-3 $ $ 4 $ $ 2-2 $ $ 3$
10486,29 10458,56 10374,44 10360,37 10322,88	$\begin{array}{c} 2 \\ 6 \\ 10 \\ 100 \\ 2 \end{array}$	12,11 12,11 12,26 12,26 12,14	13,29 13,29 13,45 13,45 13,34	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 5p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-2 \\ 2-3 \\ 1-0 \end{array} $
10296,93 10273,6 10147,68 10120,96 10077,66	80 2 10 30 10	11,67 12,14 12,14 12,14 12,04	12,87 13,35 13,36 13,36 13,27	$\begin{array}{c} 5p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \end{array}$	0-1 $2-1$ $2-2$ $1-2$ $1-1$
10065,96 10054,86 10038,65 9989,3 9917,60	10 2 3 1 3	12,14 12,38 12,38 12,10 12,10	13,37 13,62 13,62 13,34 13,34	$\begin{array}{c} 5p' \ [1^{1}/_{2}] - 6d \ [3^{1}/_{2}]^{\circ} \\ 6s \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 2 \\ 1 - 2 \\ 1 - 0 \\ 1 - 1 \end{array} $
9916,37 9897,08 9862,95 9856,24 9838,33	4 2 4 500 5	12,28 12,14 12,04 11,55 12,04	13,53 13,40 13,29 12,80 13,29	$\begin{array}{c} 4d \ [2^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{c} 3-2 \\ 2-3 \\ 1-1 \\ 2-2 \\ 1-2 \end{array} $
9810,27 9794,89 9768,69 9751,759 9743,11	$\begin{array}{c} 2\\ 3\\ 2\\ 2000\\ 50 \end{array}$	12,35 12,35 12,00 10,03 12,18	13,62 13,62 13,27 11,30 13,45	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 7p \ [1/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 5p \ [1/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 0-1 \\ 1-1 \\ 3-4 \end{array} $
9727,51 9722,78 9714,85 9704,22 9687,83	2 1 15 50 10	12,18 12,26 12,18 11,53 11,55	13,45 13,53 13,45 12,80 12,82	$\begin{array}{c} 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \end{array}$	3-2 2-1 3-3, 4 1-2 2-2
9682,26 9669,03 9615,63 9540,89 9532,3	2 1 3 30 1	12,04 12,14 12,10 11,53 12,26	13,32 13,42 13,39 12,82 13,56	$\begin{array}{c} 4d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5p' \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 6d \ [^{2}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 4d' \ [^{2}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \end{array}$	1-0 1-1 1-2 1-2 0-1
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
9450,88	20	11,55	12,86	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 5p \ [4^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \end{array}$	2—3
9362,03	100	11,55	12,87		2—1
9352,23	100	12,12	13,45		4—5, 4
9337,9	1	12,12	13,45		4—3
9326,03	1	12,12	13,45		4—3, 4
9299,40	1	12,11	13,44	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ}-6f \ [4^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ}-6f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ}-6f \ [3^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ}-5f \ [1^{1}/_{2}] \end{array}$	2—1
9287,87	1	12,28	13,62		3—4
9279,9	2	12,28	13,62		3—2, 3
9273,02	8	12,28	13,62		3—3, 4
9270,96	10	12,11	13,45		1—2
9262,69 9243,54 9243,00 9234,16 9224,83	1 30 1 1	12,11 — 12,11 12,11 11,53	13,45 13,45 13,45 12,87	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ - \\ 4d \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 6p' \ [1/_{2}] \\ 5p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	1—1 — 1—2 1—1 1—1
9188,69 9122,49 9111,69 9100,58 9094,33	$\begin{array}{c} 2 \\ 20 \\ 20 \\ 1 \\ 4 \end{array}$	12 ,11 11 ,44 11 ,44 12 ,26 12 ,26	13,46 12,80 12,80 13,62 13,62	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 5p \ [2^{1}/_{2}]-4a' \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}]-4a' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ}-6f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ}-6f \ [3^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 3-2 \\ 2-2, 3 \\ 2-3, 4 \end{array} $
9044,47	3	11,67	13,03	$\begin{array}{c} 5p \ [^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 4d' \ [^{2}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 4d' \ [^{2}/_{2}]^{\circ} \\ 5s \ [^{1}/_{2}]^{\circ} - 5p \ [^{1}/_{2}] \end{array}$	0—1
8999,19	30	11,53	12,90		1—0
8977,99	50	11,44	12,82		2—2
8967,53	10	11,44	12,82		3—2
8928,6920	2000	9,91	11,30		2—1
8870 ,32 8842 ,46 8805 ,78 8780 ,25 8776 ,7490	4 3 20 30 6000	12,12 12,04 12,04 12,04 10,03	 13,53 13,44 13,45 11,44	$\begin{array}{c} - \\ 4d \ [3^{1}/_{2}] \circ -8p \ [2^{1}/_{2}] \\ 4d \ [^{1}/_{2}] \circ -6p' \ [1^{1}/_{2}] \\ 4d \ [^{1}/_{2}] \circ -5f \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] \circ -5p \ [2^{1}/_{2}] \end{array}$	-4-3 $1-1$ $1-2$ $1-2$
8774,05 8773,00 8764,112 8755,20 8747,29	50 4 150 30 2	11,44 12,04 11,44 12,04 12,04	12,86 13,45 12,86 13,45 13,45	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 5p \ [2^{2}/_{2}] - 4d' \ [2^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 1 \\ 3 - 3 \\ 1 - 2 \\ 1 - 1 \end{array} $
8746,43 8742,49 8726,54 8722,17 8713,62	3 1 8 1 2	12,14 12,26 12,14 12,11 12,11	13,56 13,67 13.56 13,53 13,53	$\begin{array}{c} 5p' \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 4d \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 0-1 \\ 1-2 \\ 2-1 \\ 2-2 \end{array} $
8697,50	40	11,44	12,87	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 5p' \ [4^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 5d \ [4^{1}/_{2}]^{\circ} \\ 4d \ [2^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 5p' \ [4^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \end{array}$	2-1
8673,48	2	12,14	13,57		2-3
8651,49	8	11,67	13,10		0-1
8632,81	1	12,28	13,72		3-4, 5
8631,5	1	12,14	13,58		2-2
8628,70	1	12,28	13,72	$\begin{array}{c} 4d \ [2^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 4d \ [2^{1}/_{2}]^{\circ} - 7f \ [3^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	3-3, 2
8624,82	4	12,28	13,72		3-3, 4
8610,67	5	12,18	13,62		3-2
8605,85	40	12,18	13,62		3-4
8599,4	1	12,18	13,62		3-2
8593 ,1	10	12,18	13,62	$\begin{array}{c} 4d \ [3^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 6p' \ [4^{1}/_{2}] \\ 5p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 5f \ [^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5p' \ [4^{1}/_{2}] \end{array}$	3-3, 4
8569 ,02	20	12,00	13,44		0-1
8560 ,89	50	11,67	13,11		0-1
8537 ,93	40	12,00	13,45		0-1
8508 ,8700	3000	10,64	12,10		1-1
8498,21	$\begin{array}{c} 30 \\ 2 \\ 2 \end{array}$	11,55	13,00	$5p \ [4^{1}/_{2}]-4d' \ [4^{1}/_{2}]^{\circ}$	2-1
8477,20		11,55	13,01	$5p \ [4^{1}/_{2}]-5d \ [3^{1}/_{2}]^{\circ}$	2-3
8469,96		12,26	13,72	$4d \ [2^{1}/_{2}]^{\circ}-7f \ [3^{1}/_{2}]$	2-3, 4

λ, Å	I	E _H , eV	E _B , eV	Transition	J
8412,428 8384,90	100 15	11,55 11,53	13,02 13,00	$5p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ}$ $5p \ [1^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ}$	2—2 1—1
8375,93 8332,73 8321,09 8303,20	5 1 2 10	12,04 11,55	$\begin{array}{c} - \\ 13,52 \\ - \\ 13,04 \end{array}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
8301,39 8298,1077 8287,56 8281,0495	20 5000 4 1500	11,53 10,03 12,12 10,64	13,02 11,53 13,62 12,14	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5s \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5p' \ [^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 1 - 2 \\ 1 - 1 \\ 4 - 3, 4 \\ 1 - 1 \end{array} $
8272,355 8263,2398	100 3000	11,55 10,64	$13,04 \\ 12,14$	5s' [1/2] - 5p' [11/2]	$ \begin{array}{c} 1 - 1 \\ 2 - 3 \\ 1 - 2 \\ 2 - 2 \end{array} $
8228,89 8222,69 8218,40 8212,24 8210,1	10 6 80 5 1	12,11 12,14 12,11 12,11 12,14	13,62 13,65 13,62 13,62 13,65	$\begin{array}{c} 4d \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 2-3 \\ 2-2 \end{array} $
8206,62 8205,22 8195,070 8192,4 8190,0543	$ \begin{array}{r} 40 \\ 20 \\ 50 \\ 2 \\ 3000 \end{array} $	11,53 12,14 11,53 12,14 10,03	13,03 13,65 13,04 13,65 11,55	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 5s \ [1^{1}/_{2}]^{\circ} - 5p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 2 \\ 1 - 2 \\ 1 - 2 \end{array} $
8144,96 8132,98 8112,900 8104,3642 8104,02	15 60 6000 4000 500	11,30 12,14 9,91 9,91 11,44	12,82 13,67 11,44 11,44 12,97	$\begin{array}{c} 5p \ [^{1}/_{2}] - 4d' \ [^{2^{1}}/_{2}]^{\circ} \\ 5p' \ [^{1^{1}}/_{2}] - 5d' \ [^{2^{1}}/_{2}]^{\circ} \\ 5s \ [^{1^{1}}/_{2}]^{\circ} - 5p \ [^{2^{1}}/_{2}] \\ 5s \ [^{1^{1}}/_{2}]^{\circ} - 5p \ [^{2^{1}}/_{2}] \\ 5p \ [^{2^{1}}/_{2}] - 5d \ [^{3^{1}}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-3 \\ 2-2 \\ 3-4 \end{array} $
8059,5038 8040,50 8033,52 7993,12 7990,78	$1500 \\ 8 \\ 2 \\ 5 \\ 2$	10,56 12,18 12,18 12,10	12,10 13,72 13,72 13,73	$5s' [1/2]^{\circ} - 5p' [1^{1}/2]$ $4d [3^{1}/2]^{\circ} - 7f [4^{1}/2]$ $4d [3^{1}/2]^{\circ} - 7f [3^{1}/2]$ $5p' [1^{1}/2] - 5d' [1^{1}/2]^{\circ}$	0-1 3-4 3-3, 4 1-1
7982,406 7981,82 7981,19 7962,62 7957,67	100 30 20 1 2	11,55 11,55 12,10 12,11 12,14	13,10 13,10 13,65 13,67 13,70	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 4d \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 5p' \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 1-2 \\ 2-2 \\ 2-3 \end{array} $
7946,99 7938,34 7928,5996 7920,47 7913,4242	20 2 180 40 200	11,44 12,14 11,44 11,44 11,30	13,00 13,70 13,01 13,01 12,87	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 4d \ [1^{1}/_{2}]^{\circ} \\ 5p' \ [^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \end{array}$	2-1 1-2 2-3 3-3 1-1
7904,62 7882,36 7881,76 7871,93 7863,91	$\begin{array}{c} 30 \\ 10 \\ 30 \\ 2 \\ 20 \end{array}$	11,55 11,53 11,53 11,44 11,44	13,11 13,10 13,10 13,02 13,02	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-1 \\ 2-2 \\ 3-2 \end{array} $
7854,8215 7840,40 7840,01 7830,21 7806,52	800 4 8 2 15	10,56 12,04 12,04 12,04 12,04 11,53	12,14 13,62 13,62 13,62 13,11	$\begin{array}{c} 5s' \ [^{1}/_{2}]^{\circ} - 5p' \ [^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	0-1 $1-1$ $1-2$ $1-2$ $1-1$
7786,66 7776,28 7772,40 7768,43 7765,89	15 5 5 1	11,44 11,44 12,12 11,44 12,12	13,03 13,04 13,72 13,04 13,72	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 6s' \ [^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 5p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 7f \ [3^{1}/_{2}] \end{array}$	$\begin{array}{c} 2-1 \\ 2-2 \\ 4-4 \\ 5 \\ 3-2 \\ 4-3 \\ 4\end{array}$

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λ, Å	I	$E_{ m H}^{},{ m eV}$	$E_{ m B}^{},~{ m eV}$	Transition	J
7749,16 7746,828 7741,39 7712,94 7708,96	3 50 10 1	11,44 11,30 11,44 12,18 12,11	13,04 12,90 13,04 13,79 13,72	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 5d \ [2^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 8f \ [4^{1}/_{2}] \\ 4d \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2 - 3 \\ 1 - 0 \\ 3 - 3 \\ 3 - 4 \\ 2 - 2 \end{array} $
7703,41 7694,5393 7685,2460 7652,16 7601,5443	$\begin{array}{c} 2\\500\\400\\4\\2000\end{array}$	12,11 9,91 10,64 12,00 9,91	13,72 11,53 12,26 13,62 11,55	$\begin{array}{l} 4d \ [1^{1}/_{2}]^{\circ}-7f \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ}-5p \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ}-5p' \ [^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ}-6f \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ}-5p \ [1^{1}/_{2}] \end{array}$	2-3 2-1 1-0 0-1 2-2
7587,4130 7550,63 7543,10 7494,15 7493,58	1000 3 3 30 20	10,03 — 11,44 11,44	11,67 — 13,10 13,10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-0 \\ - \\ 2-2 \\ 2-1 \end{array} $
7486,862 7465,01 7459,70 7425,54 7402,70	100 3 1 60 1	11,44 12,12 12,12 11,44 12,11	13,10 13,79 13,79 13,11 13,79	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 4d \ [3^{1}/_{2}]^{\circ} - 7f \ [3^{1}/_{2}] \\ 5p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 4d \ [1^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	3—2 4—4, 5 4—3, 4 2—1 2—2
7367,02 7366,80 7362,83 7361,34 7359,96	2 2 4 1 5	12,04 12,04 12,04 11,67	13,72 13,72 — 13,72 13,35	$\begin{array}{c} 4d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ - \\ 4d \ [^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 5p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	1—1 1—2 — 1—2 0—1
7355,48 7341,16 7334,33 7327,00 7301,25	4 2 4 5 5	_ _ _ _ 12,11	 13,81	$\begin{array}{c} - \\ - \\ - \\ - \\ - \\ 4d \ [1^{1}/_{2}]^{\circ} - 4f' \ [2^{1}/_{2}] \end{array}$	
7287,262 7268,28 7234,58 7227,34 7224,103	80 1 2 2 100	11,30 12,12 — — 11,30	13,00 13,83 — — 13,02	$\begin{array}{c} 5p \ [^{1}/_{2}] - 4d' \ [1^{1}/_{2}]^{\circ} \\ 4d \ [3^{1}/_{2}]^{\circ} - 9f \ [4^{1}/_{2}] \\ - \\ 5p \ [^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	1—1 4—5, 4 — — 1—2
7200,59 7180,47 7152,21 7143,45 7133,67	2 3 5 8 1	12,00 11,30 11,30 12,12	13,72 13,03 13,04 13,86	$\begin{array}{c} 4d \ [^{1}/_{2}\]^{\circ} -7f \ [^{1}/_{2}\] \\ -\\ 5p \ [^{1}/_{2}\] -6s' \ [^{1}/_{2}\]^{\circ} \\ 5p \ [^{1}/_{2}\] -5d \ [^{2}/_{2}\]^{\circ} \\ 4d \ [^{3}/_{2}\]^{\circ} -10f \ [^{4}/_{2}\] \end{array}$	0-1 - 1-1 1-2 4-5, 4
7089 ,51 7086 ,43 7057 ,27 7008 ,62 7001 ,62	1 1 10 2 2	12,04 12,04 11,67 —	13,78 13,79 13,42 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-2 0-1 -
7000,79 6993,05 6935,38 6911,29 6904,68	7 2 2 2 100	11,67 12,04 12,00 12,04 11,30	13,44 13,81 13,78 13,83 13,10	$\begin{array}{c} 5p \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 4d \ [^{1}/_{2}]^{\circ} - 4f' \ [^{2^{1}}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 8f \ [^{1}/_{2}] \\ 4d \ [^{1}/_{2}]^{\circ} - 9f \ [^{1}/_{2}] \\ 5p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $1-2$ $0-1$ $1-1$ $1-2$
6904,22 6869,63 6862,82 6853,32 6846,40	15 20 3 2 20	11,30 11,55 — — 11,30	13,10 13,35 — — 13,11	$\begin{array}{c} 5p \ [^{1}/_{2}] - 5d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ - \\ 5p \ [^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	1—1 2—1 — — 1—1
6829,09 6813,10 6795,40	8 50 4	11,53 11,55 11,53	13,34 13,36 13,35	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 6b \ [^{1}/_{2}]^{\circ} \end{array}$	1—0 2—2 1—1

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	λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
	6789 ,21 6776 ,15	1 3	12,04 11,55	13,86 13,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1-1 , \ 2 \\ 2-3 \end{array}$
	6764,51 6740,10 6723,36 6699,228 6652,239	$\begin{array}{c} 2 \\ 20 \\ 4 \\ 60 \\ 40 \end{array}$	12,00 11,53 11,55 11,55 11,53	13,83 13,36 13,39 13,40 13,39	$\begin{array}{c} 4d \ [^{1}/_{2}\]^{\circ} - 9f \ [^{1}/_{2}\] \\ 5p \ [^{1}/_{2}\] - 6d \ [^{1}/_{2}\]^{\circ} \\ 5p \ [^{1}/_{2}\] - 6d \ [^{2}/_{2}\]^{\circ} \\ 5p \ [^{1}/_{2}\] - 6d \ [^{2}/_{2}\]^{\circ} \\ 5p \ [^{1}/_{2}\] - 6d \ [^{2}/_{2}\]^{\circ} \end{array}$	0-1 $1-2$ $2-2$ $2-3$ $1-2$
	6647,94 6612,38 6605,12 6576,42 6555,69	$\begin{array}{c} 2 \\ 2 \\ 2 \\ 20 \\ 6 \end{array}$	12,00 — 11,55 11,55 11,55	13,86 — 13,42 13,43 13,44	$\begin{array}{c} 4d \ [^{1}/_{2}]^{\circ} - 10f \ [1^{1}/_{2}] \\ - \\ 5p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \end{array}$	0-1 $ 2-1$ $2-2$ $2-1$
	6555,56 6536,55 6508,37 6504,89 6488,07	2 8 3 10 15	11,67 11,53 11,53 11,44 11,53	13,56 13,42 13,43 13,35 13,44	$\begin{array}{c} 5p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1^{1}}/_{2}] - 6d \ [^{1^{1}}/_{2}]^{\circ} \\ 5p \ [^{1^{1}}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{2^{1}}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1^{1}}/_{2}] - 8s \ [^{1^{1}}/_{2}]^{\circ} \end{array}$	0-1 $1-1$ $1-2$ $2-1$ $1-1$
	6456,2910 6454,19 6448,78 6421,0283 6415,65	$200 \\ 1 \\ 10 \\ 100 \\ 20$	11,44 11,44 11,44 11,44 11,44	13,36 13,36 13,36 13,37 13,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 2-2 3-2 2-3 3-3
	6410,17 6373,58 6373,19 6368,26 6351,90	5 30 1 4 8	11,67 11,44 11,67 11,44 11,44	13,60 13,39 13,61 13,39 13,40	$\begin{array}{c} 5p \ [^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-2$ $0-1$ $3-2$ $2-3$
	6346,66 6267,33 6241,39 6236,3520 6222,71	20 2 10 30 20	11,44 11,44 11,44 11,44 11,44	13,40 13,42 13,43 13,43 13,44	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3—3 2—1 2—2 3—2 2—1
	6172,08 6163,65 6151,38 6115,23 6108,34	$\begin{array}{c} 2 \\ 7 \\ 20 \\ 3 \\ 3 \end{array}$	11,67 11,55 11,55 11,55 11,53	13,67 13,56 13,56 13,57 13,57	$\begin{array}{c} 5p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 7d \ [^{3}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-1$ $2-2$ $2-3$ $1-0$
	6103,86 6094,31 6091,81 6088,00 6082,8630	1 2 6 2 40	14,53 11,55 14,53 11,67 11,30	13,56 13,58 13,56 13,70 13,34	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 1 - 2 \\ 0 - 1 \\ 1 - 0 \end{array} $
	6075,24 6056,1280 6049,35 6035,82 6012,1570	20 60 3 15 50 {	11,55 41,30 41,67 11,53 41,55 11,30	13,59 13,35 13,71 43,58 43,61 13,36	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 9s \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	2-3 1-1 0-1 2-2 2-2 1-2
	6002,19 5993,8506 5977,65 5955,14 5945,44	3 60 4 2 5	11,55 10,03 11,53 11,53 11,53	13,61 12,10 13,60 13,61 13,61	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5s \ [1^{1}/_{2}]^{\circ} - 5p' \ [1^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-1 1-1 1-1 1-2 1-1
	5942,13 5887,68 5881,18 5879,9000 5870,9153	$\begin{array}{c} 2\\ 3\\ 2\\ 50\\ 3000 \end{array}$	11,30 11,55 11,55 10,03 10,03	13,39 13,65 13,65 12,14 12,14	$\begin{array}{c} 5p \ [^{1}/_{2}] - 6d \ [^{21}/_{2}]^{\circ} \\ 5p \ [^{11}/_{2}] - 5d' \ [^{11}/_{2}]^{\circ} \\ 5p \ [^{11}/_{2}] - 5d' \ [^{21}/_{2}]^{\circ} \\ 5s \ [^{11}/_{2}]^{\circ} - 5p' \ [^{1}/_{2}] \\ 5s \ [^{11}/_{2}]^{\circ} - 5p' \ [^{11}/_{2}] \end{array}$	1-2 $2-2$ $2-2$ $1-1$ $1-2$
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λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
5866 ,7514 5857 ,32 5852 ,86 5849 ,66 5841 ,44	50 1 5 2 4	10,64 11,44 11,44 11,30 11,55	12,76 13,56 13,56 13,42 13,67	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 3 - 2 \\ 1 - 1 \\ 2 - 3 \end{array} $
5832,8600 5827,07 5824,50 5823,51 5820,10	100 20 40 3 15	11,44 11,30 11,44 11,55 11,44	13,57 13,43 13,57 13,67 13,57	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 8s \ [4^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [4^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-4 \\ 1-2 \\ 2-3 \\ 2-1 \\ 3-3 \end{array} $
5810,80 5805,53 5801,17 5788,24 5787,29	$egin{array}{c} 8 \\ 20 \\ 2 \\ 7 \\ 6 \\ \end{array}$	11,30 11,44 11,44 11,44 10,64	13,44 13,58 13,58 13,59 12,78	$\begin{array}{c} 5p \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 7d \ [^{2}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 7d \ [^{2}/_{2}]^{\circ} \\ 5p \ [^{2}/_{2}] - 7d \ [^{2}/_{2}]^{\circ} \\ 5r \ [^{1}/_{2}] - 6p \ [^{2}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 3 - 2 \\ 2 - 3 \\ 1 - 2 \end{array} $
5783,89 5775,56 5762,90 5755,04 5754,33	10 2 4 2 1	11,44 10,03 11,55 11,53 11,55	13,59 12,18 13,70 13,67 13,70	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5s \ [2^{1}/_{2}]^{\circ} - 4d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8d \ [1/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3 - 3 \\ 1 - 3 \\ 2 - 3 \\ 1 - 1 \\ 2 - 2 \end{array} $
5750,57 5749,02 5730,86 5726,59 5 72 3,56	10 5 4 20 15	11,55 11,55 11,44 11,44 10,64	13,70 13,70 13,61 13,61 12,81	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5s' \ [^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \end{array}$	2—3 2—2 2—2 3—2 1—1
5721,88 5717,61 5714,11 5707,5188 5702,19	10 3 2 40 10	11,44 11,55 11,55 10,64 11,53	13,61 13,71 13,71 12,82 13,70	$\begin{array}{c} 5p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5s' \ [^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-1 \\ 1-2 \\ 1-2 \end{array} $
5696,95 5696,54 5672,4519 5666,09 5662,67	1 3 50 1 3	11,53 11,53 9,91 11,53 11,53	13,70 13,70 12,10 13,71 13,71	$\begin{array}{c} 5p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5s \ [1^{1}/_{2}]^{\circ} - 5p' \ [1^{1}/_{2}] \\ 5p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 2 \\ 1 - 1 \\ 2 - 1 \\ 1 - 2 \\ 1 - 1 \end{array} $
5649,5625 5611,82 5608,37 5607,72 5591,41	100 4 3 1 2	10,56 11,44 9,91 11,44 11,55	12,76 13,65 12,12 13,65 13,76	$\begin{array}{c} 5s' \ [^{1}/_{2}] ^{\circ} - 6p \ [^{1}/_{2}] \\ 5p \ [^{2^{1}}/_{2}] - 5d' \ [^{2^{1}}/_{2}] ^{\circ} \\ 5s \ [^{4^{1}}/_{2}] ^{\circ} - 4d \ [^{3^{1}}/_{2}] ^{\circ} \\ 5p \ [^{2^{1}}/_{2}] - 5d' \ [^{2^{1}}/_{2}] ^{\circ} \\ 5p \ [^{4^{1}}/_{2}] - 7s' \ [^{1}/_{2}] ^{\circ} \end{array}$	$0-1 \\ 2-2 \\ 2-4 \\ 3-2 \\ 2-1$
5580,3890 5577,64 5575,6 5573,43	80 3 10 2	10,64 11,55 — 10,03	12,86 13,77 — 12,26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$egin{array}{c} {f 1} - 0 \\ {f 2} - 2 \\ {f -} \\ {f 1} - 0 \\ {f 2} - {f 1} \end{array}$
5570,2890 5562,2254 5559,26 5544,4 5542,10 5539,4	2000 500 2 1 1 1	9,91 9,91 11,44 11,55 11,53 11,55	12,14 12,14 13,67 13,78 13,75 13,78	$5s [1^{1}/2] - 5p' [1^{1}/2]$ $5s [1^{1}/2] \circ -5p' [1^{1}/2]$ $5p [2^{1}/2] - 8d [1^{1}/2] \circ$ $5p [1^{1}/2] - 11s [1^{1}/2] \circ$ $5p [1^{1}/2] - 9d [1^{1}/2] \circ$ $5p [1^{1}/2] - 11s [1^{1}/2] \circ$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-1 \\ 2-2 \\ 1-1 \\ 2-1 \end{array} $
5528,63 5521,17 5520,52 5516,66 5511,16	2 3 40 20 1	11,53 11,53 11,44 10,56 11,53	13,77 13,77 13,69 12,81 13,78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 $1-2$ $3-4$ $0-1$ $1-1$
5504 ,34 5504 ,02 5500 ,71	20 15 50	11,30 11,44 11,30	13,55 13,70 13,56	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 0 \\ 2 - 3 \\ 1 - 1 \end{array} $

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λ. Α	ı	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
5496 ,21 5492 ,77	3 1	11 ,44 11 ,44	13,70 13,70	5p [2 ¹ / ₂]—8d [2 ¹ / ₂]° 5p [2 ¹ / ₂]—8d [2 ¹ / ₂]°	$\begin{array}{c} 2-2 \\ 2-3 \end{array}$
5491 ,33 5490 ,94	2 50	11,44 11,53	13,70 13,78	$5p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} $ $5p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ}$	$\begin{array}{c} 2-2 \\ 1-1 \\ \end{array}$
5488,86	5 1	11,33 11,30 11,44 11,44	13,56 13,70 13,70	$5p [1/2] - 7d [11/2]^{\circ}$ $5p [21/2] - 8d [21/2]^{\circ}$ $5p [21/2] - 8d [11/2]^{\circ}$	$\begin{array}{c} 1-2 \\ 3-3 \\ 3-2 \end{array}$
5487,46 5476,58	2	9,91	12,18	$5s \left[1^{1}/_{2}\right]^{\circ} - 4d \left[3^{1}/_{2}\right]^{\circ}$	2—3
5462,65 5461,37 5459,47	2 1 4	11 ,44 11 ,55 11 ,44	13,71 13,81 13,71	$5p [2^{1}/_{2}] - 10s [1^{1}/_{2}]^{\circ}$ $5p [1^{1}/_{2}] - 10d [^{1}/_{2}]^{\circ}$ $5p [2^{1}/_{2}] - 10s [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 2-1 \end{array} $
5458,80 5456,39	$\frac{7}{2}$	11,44 11,55	13,71 13,82	$5p [2^{1/2}] - 10s [1^{1/2}]^{\circ}$ $5p [1^{1/2}] - 10d [1^{1/2}]^{\circ}$	$\begin{array}{ccc} & -\hat{2} & \\ 2-2 & \end{array}$
5447 ,86 5445 ,43	3 1	11,55 11,30	13,82 13,58	$5p \begin{bmatrix} 1^{1}/_{2} \end{bmatrix} - 10d \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}^{\circ} 5p \begin{bmatrix} 1/_{2} \end{bmatrix} - 7d \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}^{\circ}$	$\begin{array}{c} 2 - 3 \\ 1 - 2 \end{array}$
5431 ,77 5414 ,42 5409 ,44	1 1 1	11,55 11,53 11,53	13,83 13,81 13,82	$5p \ [1^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ}$ $5p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ}$ $5p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ}$	$\begin{array}{c} 2-2 \\ 1-1 \\ 1-2 \end{array}$
5403,03 5379,64	$\frac{2}{15}$	11,53 11,30	13,82 13,82 13,61	$5p \left[\frac{1}{2}\right] - 10d \left[\frac{2}{2}\right]^{\circ}$ $5p \left[\frac{1}{2}\right] - 9s \left[\frac{1}{2}\right]^{\circ}$	1-2 $1-2$ $1-2$
5373,54 5372,57 5371,74	$\frac{1}{2}$	11,55 11,30	13,85 13,85 13,61	5p [1/2] - 3s [1/2] $5p [11/2] - 11d [11/2]^{\circ}$ $5p [1/2] - 9s [11/2]^{\circ}$	$\begin{array}{c} 1-2\\ 2-2\\ 1-1 \end{array}$
5365,91 5347,37	1 2	11,55 11,44	13,86 13,75	$5p [1^{1}/_{2}] - 11d [2^{1}/_{2}]^{\circ}$ $5p [2^{1}/_{2}] - 9d [^{1}/_{2}]^{\circ}$	2—3 2—1
5339 ,13 5334 ,78	20 10	11 ,44 11 ,44	13,76 $13,77$	$ 5p [2^{1}/_{2}] - 9d [3^{1}/_{2}]^{\circ} $ $ 5p [2^{1}/_{2}] - 9d [4^{1}/_{2}]^{\circ} $	$\begin{array}{c} 3-4 \\ 2-2 \end{array}$
5331,08 5327,87	2 2	11 ,44 11 ,44	13,77 13,77	$5p [2^{1/2}] - 9d [1^{1/2}]^{\circ}$ $5p [2^{1/2}] - 9d [2^{1/2}]^{\circ}$	3—2 2—2
5325,70 $5322,02$ $5304,43$	<u>ነ</u> 2 1	11 ,44 11 ,44 11 ,44	13,77 13,77 13,78	$5p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ}$ $5p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ}$ $5p \ [2^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 2-3 \\ 3-3 \\ 2-2 \end{array} $
5300,74 5299,79	$\frac{1}{3}$	11,44 11,44	13,78 13,78	$5p [2^{1/2}] - 11s [1^{1/2}]^{\circ}$ $5p [2^{1/2}] - 11s [1^{1/2}]^{\circ}$ $5p [2^{1/2}] - 11s [1^{1/2}]^{\circ}$	$\begin{array}{c} 3-2\\ 2-1 \end{array}$
5279 ,84 5274 ,61	9 4	11,30 11,30	13,65 13,65	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
5232,06 5228,18 5223,57	$\begin{array}{c}2\\20\\5\end{array}$	9,91 11,30 11,44	12,28 13,67 13,82	$\begin{array}{c} 5s \left[1^{1}/_{2}\right]^{\circ} - 4d \left[2^{1}/_{2}\right]^{\circ} \\ 5p \left[^{1}/_{2}\right] - 8d \left[^{1}/_{2}\right]^{\circ} \\ 5p \left[2^{1}/_{2}\right] - 10d \left[3^{1}/_{2}\right]^{\circ} \end{array}$	$ \begin{array}{c} 2 - 3 \\ 1 - 1 \\ 3 - 4 \end{array} $
5222,38 5218,84	3 1	11,44 11,44	13,82 13,82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—3 3—3
5217,78 5215,81	1 8	11,44 11,30	13,82 13,68	$5p \ [2^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ}$ $5p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ}$	$\begin{array}{c} 2-2 \\ 1-0 \end{array}$
5212,41 5198,97	1 1	11 ,44 11 ,44	13,82 13,83	$5p [2^{1}/_{2}] - 10d [2^{1}/_{2}]^{\circ}$ $5p [2^{1}/_{2}] - 12s [1^{1}/_{2}]^{\circ}$	3—3 2—1
5197,82 5172,36	1 2	11,44 11,30	13,83 13,70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3-2 \\ 1-2 \end{array}$
5168,06 5167,73	4 1	11,30 11,30	13,70 13,70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ 1-1 \end{array} $
5145,39 5145,04	1 2	11,44 11,44	13,85 13,85	$5p [2^{1}/_{2}] - 11d [3^{1}/_{2}]^{\circ}$ $5p [2^{1}/_{2}] - 11d [3^{1}/_{2}]^{\circ}$	2—3 3—4
5142 ,7 5139 ,9 5109 ,81	4 1 2	11,30 11,30 —	13,71 13,71 —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-1 \\ 1-2 \\ - \end{array} $
5090,36 5089,12	$rac{1}{2}$	11,44 11,44	13,88 13,88	$5p [2^{1}/_{2}] - 12d [3^{1}/_{2}]^{\circ}$ $5p [2^{1}/_{2}] - 12d [3^{1}/_{2}]^{\circ}$	2—3 3—4
5058,08 5047,74	4 1	11,30 11,44	$13,75 \\ 13,90$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4 1-0 3-4
5040,34 538	7	11,30	13,75	$5p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ}$	1—1

λ. Λ	I	E _H , eV	$E_{ m B}$, eV	Transition	J
5029,45 5002,44 4969,36 4969,08 4955,27	5 2 15 20 15	11,30 11,30 10,64 10,64 10,64	13,77 13,78 13,14 13,14 13,14	$\begin{array}{c} 5p \ [^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 5s' \ [^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-2 \\ 1-1 \\ 1-2 \end{array} $
4938,38 4934,48 4930,38 4910,39 4867,24	2 4 4 2 1	11,30 11,30 11,30 11,30 11,30	13,81 13,81 13,82 13,83 13,85	$\begin{array}{c} 5p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 11d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 0 \\ 1 - 1 \\ 1 - 2 \\ 1 - 2 \\ 1 - 0 \end{array} $
4864,91 4861,84 4861,31 4812,6367 4810,51	2 2 4 40 3	11,30 11,30 — 10,56	13,85 13,85 — 13,14	$\begin{array}{c} 5p \ [^{1}/_{2}] - 11d \ [^{1}/_{2}]^{\circ} \\ 5p \ [^{1}/_{2}] - 11d \ [^{1}/_{2}]^{\circ} \\ - \\ 5s' \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \end{array}$	1—1 1—2 — 0—1
4724,89 4722,16 4694,84 4677,16 4671,61	20 3 4 1 10	10,64 10,64 10,64 10,64	13,27 — 13,28 13,29 13,29	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 — 1—2 1—1 1—2
4636,14 4550,2985 4538,06 4502,3546 4463,6901	20 40 3 600 800	10,64 10,03 10,56 10,03 10,03	13,32 12,76 13,29 12,78 12,81	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—0 1—1 0—1 1—2 1—1
4453,9177 4425,1908 4418,7626 4416,8338 4412,39	600 100 50 20 6	10,03 10,64 10,64 10,64 10,64	12,82 13,44 13,45 13,45 13,45	$\begin{array}{c} 5s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \end{array}$	1-2 1-1 1-2 1-1 1-2
4410,3685 4399,9670 4380,11 4376,1219 4362,6424	50 200 2 800 500	10,64 10,64 — 10,03 9,91	13,45 13,46 — 12,86 12,76	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-2 - 1-0 2-1
4354,23 4353,90 4351,3602 4349,55 4319,5798	$ \begin{array}{c} 2\\ 100\\ 2\\ 1000 \end{array} $	10,64 9,91	13,49 12,78	$ \begin{array}{c} $	1-0 2-3
4318,5523 4302,4455 4300,4877 4292,64 4290,78	$400 \\ 10 \\ 50 \\ 6 \\ 4$	9,91 10,64 10,56 10,56	12,78 13,52 13,44 13,45	$5s [1^{1}/_{2}]^{\circ} - 6p [2^{1}/_{2}]$ $5s' [1^{\prime}/_{2}]^{\circ} - 8p [1^{\prime}/_{2}]$ $5s' [1^{\prime}/_{2}]^{\circ} - 6p' [1^{1}/_{2}]$ $5s' [1^{\prime}/_{2}]^{\circ} - 5f [1^{1}/_{2}]$	2—2 1—1 0—1 0—1
4288,02 4286,4875 4282,9686 4273,9700 4263,2881	5 40 100 1000 20	10,64 10,56 9,91 9,91 10,64	13,53 13,45 12,81 12,82 13,55	$\begin{array}{c} 5s' \ [^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \end{array}$	1-2 $0-1$ $2-1$ $2-2$ $1-0$
4184,4726 4172,83 4167,28 4164,48 4108,43	20 3 5 2 3	10,56 10,56 10,64 10,64 10,64	13,52 13,53 13,62 13,62 13,66	$5s' [1/2]^{\circ} -8p [1/2]$ $5s' [1/2]^{\circ} -8p [1^{1}/2]$ $5s' [1/2]^{\circ} -6f [1^{1}/2]$ $5s' [1/2]^{\circ} -6f [2^{1}/2]$ $5s' [1/2]^{\circ} -9p [1/2]$	0-1 0-1 1-1 1-2 1-1
4097,84 4086,90 4056,57	1 2 3	10,64 10,64 10,56	13,67 13,68 13,62	$5s' [1/2]^{\circ} - 9p [1^{1}/2]$ $5s' [1/2]^{\circ} - 9p [1/2]$ $5s' [1/2]^{\circ} - 6f [1^{1}/2]$	$ \begin{array}{c} 1-2 \\ 1-0 \\ 0-1 \end{array} $

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
4029,66 4028,03	2	10,64 10,64	13,72 13,72	$5s' [1/2]^{\circ} -7f [1^{1}/2]$ $5s' [1/2]^{\circ} -7f [2^{1}/2]$	1—1 1—2
4000,72 3994,82 3991,2581 3991,0797 3982,1699	$\begin{array}{c} 2\\ 3\\ 10\\ 20\\ 6 \end{array}$	10,56 10,64 10,03 10,03 10,03	13,66 13,75 13,14 13,14 13,14	$\begin{array}{c} 5s' \ [^{1}/_{2}\]^{\circ} - 9p \ [^{1}/_{2}\] \\ 5s' \ [^{1}/_{2}\]^{\circ} - 10p \ [^{1}/_{2}\] \\ 5s \ [^{1}/_{2}\]^{\circ} - 4f \ [^{1}/_{2}\] \\ 5s \ [^{1}/_{2}\]^{\circ} - 4f \ [^{1}/_{2}\] \\ 5s \ [^{1}/_{2}\]^{\circ} - 4f \ [^{2}/_{2}\] \end{array}$	0-1 1-1 1-1 1-2 1-2
3926,05 3892,69 3846,12 3845,9778 3837,81	1 1 2 15 30	10,56 10,56 9,91 9,91 9,91	13,72 13,75 13,14 13,14 13,14	$\begin{array}{c} 5s' \ [^{1}/_{2}]^{\circ} - 7f \ [^{1}/_{2}] \\ 5s' \ [^{1}/_{2}]^{\circ} - 10p \ [^{1}/_{2}] \\ 5s \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 5s \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 5s \ [^{1}/_{2}]^{\circ} - 4f \ [^{2}/_{2}] \end{array}$	0-1 $0-1$ $2-1$ $2-2$ $2-3$
3812,2155 3800,5437 3796,8839 3773,4241 3698,0452	20 30 20 50 6	10,03 10,03 10,03 10,03 9,91	13,28 13,29 13,29 13,32 13,27	$\begin{array}{l} 5s \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5s \ [4^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 1-0 \\ 2-1 \end{array} $
3679,58 3668,7363 3665,3259 3632,4896 3628,1570	100 10 80 4 10	9,91 9,91 9,91 10,03 10,03	13,28 13,29 13,29 13,44 13,45	$\begin{array}{l} 5s \left[1^{1}/_{2}\right] ^{\circ} - 7p \left[2^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right] ^{\circ} - 7p \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right] ^{\circ} - 7p \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right] ^{\circ} - 6p' \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right] ^{\circ} - 5f \left[1^{1}/_{2}\right] \end{array}$	$ \begin{array}{ccc} 2-3, & 2 \\ 2-1 \\ 2-2 \\ 1-1 \\ 1-2 \end{array} $
3626 ,91 3623 ,84 3622 ,53 3615 ,4755 3549 ,44	2 1 1 20 1	10,03 10,03 10,03 10,03 10,03	13,45 13,45 13,45 13,46 13,52	$\begin{array}{l} 5s \ [1^{1}/_{2}] ^{\circ}5f \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] ^{\circ}5f \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] ^{\circ}6p' \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] ^{\circ}6p' \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}] ^{\circ}8p \ [^{1}/_{2}] \end{array}$	1-1 1-2 1-1 1-2 1-1
3546 ,46 3540 ,9538 3539 ,5416 3522 ,6747 3511 ,8963	3 5 5 15 4	10,03 10,03 10,03 10,03 9,91	13,53 13,53 13,53 13,55 13,44	$\begin{array}{l} 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [1/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 1-0 \\ 2-1 \end{array} $
3507,84 3506,66 3503,8981 3502,5537 3495,9900	3 3 15 20 10	9,91 9,91 9,91 19,91	13,45 13,45 13,45 13,45 13,46	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-3 \\ 2-1 \\ 2-2 \end{array} $
3460 ,13 3456 ,87 3454 ,90 3434 ,1423 3431 ,7217	2 3 1 8 20		13,62 13,62 13,52 13,53	$\begin{array}{c} - \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 6f \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 6f \left[2^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 8p \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 8p \left[2^{1}/_{2}\right] \end{array}$	$\begin{array}{c} - \\ 1-1 \\ 1-2 \\ 2-1 \\ 2-3 \end{array}$
3431,45 3426,27 3424,9433 3412,80 3409,89	2 2 15 1 2	9,91 9,91 9,91 10,03 10,03	13,53 13,53 13,53 13,66 13,67	$\begin{array}{l} 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-2 \\ 1-2 \\ 1-1 \end{array} $
3408,97 3401,40 3361,74 3347,50 3345,73	2 5 2 2 4	10,03 10,03 10,03 9,91 9,91	13,67 13,68 13,72 13,62 13,62	$\begin{array}{l} 5s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 5s \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 1-2 \\ 1-0 \\ 1-1 \\ 2-1 \\ 2-3 \end{array} $
3337,17 3334,47 3332,47 3328,00 3306,17	1 1 2 7	10,03 10,03 10,03 10,03 9,91	13,75 13,75 13,75 13,76 13,66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-2 1-2 1-0 2-3, 2
540					

λ, Å	I	E _H , eV	EB, eV	Transition	J
3302,54 3280,59 3258,00 3257.10 3232,80	10 1 1 1 2	{ 10,03 9,91 10,03 9,91 9,91 9,91	13,78 13,67 13,81 13,72 13,72 13,75	$5s [1^{1}/_{2}]^{\circ} - 8f [1^{1}/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 9p [1^{1}/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 11p [1^{1}/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 7f [1^{1}/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 7f [2^{1}/_{2}]$ $5s [1^{1}/_{2}]^{\circ} - 10p [2^{1}/_{2}]$	1—2 2—2 1—0 2—2 2—3 2—3, 2
3230,68 3186,01 3184,53 1235,839 1164,868	2 1 1 13 4	9,91 9,91 9,91 0,00 0,00	13,75 13,80 13,81 10,03 10,64	$\begin{array}{c} 5s \left[1^{1}/_{2}\right]^{\circ} - 10p \left[1^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 11p \left[2^{1}/_{2}\right] \\ 5s \left[1^{1}/_{2}\right]^{\circ} - 11p \left[1^{1}/_{2}\right] \\ 4p^{6} {}^{1}S - 5s \left[1^{1}/_{2}\right]^{\circ} \\ 4p^{6} {}^{1}S - 5s' \left[1^{1}/_{2}\right]^{\circ} \end{array}$	2-2 2-3, 2 2-2 0-1 0-1
1134,89 1134,15 1030,020 1003,542 1001,048	3 3 2 2 2	 0,00 0,00 0,00	- 12,04 12,35 12,38	$-\atop -\atop -$	 0-1 0-1 0-1
963,34 953,42 951,06 946,52 945,45	1 1 0 1 1	00,00 00,00 00,00 00,00 00,00	12,87 13,00 13,03 13,10 13,11	$4p^{6} ^{1}S - 5d [^{1}/_{2}]^{\circ}$ $4p^{6} ^{1}S - 4d' [^{1}/_{2}]^{\circ}$ $4p^{6} ^{1}S - 6s' [^{1}/_{2}]^{\circ}$ $4p^{6} ^{1}S - 5d [^{1}/_{2}]^{\circ}$ $4p^{6} ^{1}S - 7s [^{1}/_{2}]^{\circ}$	0—1 0—1 0—1 0—1 0—1

Kr II, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^{5-2}P_{3/2}^0$ Ionization potential 198 182,00 cm⁻¹; 24,570 eV

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
10659,5 10639,34 10562,84 10431,84 10428,40	1 6 4 2 10	17,37 17,37 17,65	18,54 18,54 18,62 —	5p ² P°—4d′ ² D 5p ² D°—4d′ ² D 5p ² S°—4d′ ² P —	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ \\ \\ \end{array} $
10389,28 10361,15 10221,46 10177,41 10167,61	8 100 1000 3 10	16,18 20,86 16,18 15,62 17,65 17,60	17,37 22,06 17,38 16,83 18,87 18,82	$4d\ ^4P - 5p\ ^2P^\circ$ $5f\ ^2F^\circ - 5d'\ ^2F$ $4d\ ^4P - 5p\ ^4D^\circ$ $4d\ ^4F - 5p\ ^4D^\circ$ $5p\ ^2S^\circ - 4d'\ ^2P$ $5p\ ^2D^\circ - 4d'\ ^2P$	$ \begin{array}{c} 1/2 - 3/2 \\ 7/2 - 7/2 \\ 1/2 - 1/2 \\ 9/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
10157,07 10127,74 10042,27 10017,97 9966,67	2 4 20 20 5	20,02 19,96 20,60 — 16,83	21,24 21,19 21,83 — 18,08	$ 5d ^{4}D-4^{\circ} 5d ^{4}P-3^{\circ} 1^{\circ}-5d' ^{2}D -5p ^{4}P^{\circ}-5s'' ^{2}S $	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ - \\ 1/2 - 1/2 \end{array} $
9954,75 9892,97 9851,40 9833,8 9826,58	20 10 3 5 100	17,37 17,57 — —	18,62 18,82 — — —	5p ² P°—4d′ ² D 5p ⁴ S°—4d′ ² D — — —	3/2-3/2 3/2-3/2 - -
9823,39 9803,14 9800,6 9795,1 9777,6	100 500 5 2 2	- - - -	_ _ _ _	— — — —	_ _ _ _
9770 ,1 9739 ,4	${ 2 \atop 2}$	_	_	- -	-

λ, ἤ	I	$E_{ m H},~{ m eV}$	$E_{ m B}$, eV	Transition	J
9720,6 9717,16 9711,60	$\begin{array}{c} 3 \\ 10 \\ 200 \end{array}$	_ _ _	- 	_ _ _	
9693,27 9672,90 9663,34 9622,5 9619,61	2 6 200 3 400	16,29 —			5/ ₂ —3/ ₂ —
9613,80 9605,80	100 500	20,89	22,17 - 17,38	5f ² F°—5g ⁴ G — 4d ⁴ F—5p ⁴ D°	$^{5/2}_{-}^{-5/2}_{-}_{3/2}^{-1/2}$
9594,24 9577,52 9564,32	100 500 5	16,08 16,08 —	17,37 17,37 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{5/2}{2}$ $\frac{5/2}{5/2}$ $\frac{5/2}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
9561,26 9552,85 9549,4 9543,64 9520,23	$\begin{array}{c} 2 \\ 10 \\ 2 \\ 10 \\ 4 \end{array}$			 5f ⁴ F°—5g ⁴ G _	3/ ₂ —5/ ₂
9504,70 9500,60 9476,4 9475,06	100 100 5 100	15,85 — — 20,86	17,16 — 22,17	5s' ² D—5p ⁴ D° — — 5f ² F°—5g ⁴ G	$^{5/2}_{-}^{-3/2}_{-}_{-}_{-}_{-}_{-7/2}^{-9/2}$
9470,93 9461,67 9440,02 9437,21 9430,25 9414,94	200 3 100 20 5 100	20,86 	22,17 	$5f^{2}F^{\circ}-5g^{4}G$ - $6s^{2}P-5f'^{2}F^{\circ}$ $5p'^{2}P^{\circ}-5d^{4}P$ $5f^{2}F^{\circ}-5g^{4}G$ $4d^{4}P-5p^{2}D^{\circ}$	7/2 - 7/2 - $1/2 - 5/2$ $3/2 - 1/2$ $7/2 - 5/2$ $5/2 - 3/2$
9413,32 9402,82 9388,08 9363,6 9361,95	3 200 50 1 300	20,85 20,09 17,17	22,17 	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9349,08 9345,11 9337,73 9330,66 9326,19	100 100 2 5 4	20,84 20,84 20,09	22,17 22,17 	$5f {}^{4}F^{\circ} - 5g {}^{4}G$ $5f {}^{4}F^{\circ} - 5g {}^{4}G$ $ 6s {}^{2}P - 5f' {}^{2}D^{\circ}$	72 $7/2$ $9/2$ $7/2$ $7/2$ $7/2$ $-7/2$
9320,99 9317,84 9305,76 9296,1 9293,82	200 30 1 60 500	20,84 20,84 20,84 — 20,84	22,47 22,47 22,47 ————————————————————————————————————	$5f {}^{4}F^{\circ} - 5g {}^{4}G$ $5f {}^{4}F^{\circ} - 5g {}^{4}G$ $5f {}^{4}F^{\circ} - 5g {}^{4}G$ $ 5f {}^{4}F^{\circ} - 5g {}^{4}G$	$ \begin{array}{c}$
9289,95 9271,99 9269,38 9266,17 9262,93	20 50 2 2 2	15,82 21,33 18,87	17,16 	$5s' ^2D - 5p ^4D^\circ$ $-4d'' ^2D - 11^\circ$ $5p' ^2P^\circ - 5d ^4D$	$\begin{array}{c} -\\ 3/2 - 3/2\\ -\\ 3/2 - 5/2\\ 1/2 - 1/2 \end{array}$
9245,45 9238,48 9233,18 9207,27 9196,7 9181,23 9175,42 9164,04	20 500 50 8 1 10 40	16,87 16,23 21,32	18,21 17,57 22,67	5p ⁴ D°—4d′ ² G 4d ⁴ P—5p ⁴ S° — 4d″ ² D—11° —	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9157,82 9133,4	2 8	=	_ _ _	_ _ _	_ _ _

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
9131,21 9115,00 9099,72 9096,49 9094,5	6 20 15 4 2	_ _ _ _	 	- 	
9090,98 9087,18 9044,55 9039,95 9025,67	3 2 10 20 10			$\frac{-}{6s} \frac{4P}{-}5p'' \frac{2P}{2P}$ $\frac{-}{5p} \frac{2P}{-}4d' \frac{2D}{2D}$	$ \begin{array}{c} -\\ 3/_2 - 3/_2 \\ -\\ 1/_2 - 3/_2 \end{array} $
9006,15 8999,11 8978,70 8908,26 8840,09	10 6 15 3 4	16,23 16,83 17,16 — 18,56	17,60 18,21 18,54 — 19,96	$4d\ ^4P - 5p\ ^2D^\circ \ 5p\ ^4D^\circ - 4d'\ ^2G \ 5p\ ^4D^\circ - 4d'\ ^2D \ - \ 5p'\ ^2F^\circ - 5d\ ^4P$	$ \begin{array}{c} 3/_{2} - 3/_{2} \\ 7/_{2} - 7/_{2} \\ 3/_{2} - 5/_{2} \\ - \\ 7/_{2} - 5/_{2} \end{array} $
8833,42 8829,38 8810,10	3 5 2	$\left\{\begin{array}{c} - \\ 20,02 \\ 20,01 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $	21,42 21,42 —	$5d ^4D - 5f' ^2D^{\circ}$ $5d ^4P - 7^{\circ}$	$ \begin{array}{c}$
8804,65 8798,65 8717,31 8707,61 8690,19 8674,26	3 3 2 8 100 2	20,06 	21,47 21,63 17,60 17,25 18,08	$5d\ ^4D-5f'\ ^2F^\circ \ -5d\ ^4D-5f'\ ^2P^\circ \ 4d\ ^4P-5p\ ^2D^\circ \ 5s'\ ^2D-5p\ ^2P^\circ \ 5p\ ^4P^\circ-5s''\ ^2S$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8651,50 8619,34 8613,58 8595,91 8563,59 8551,33	5 1 2 4 2 2	18,62 — 18,62 17,37	20,06 — 20,07 18,82	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} - \\ 3/2 - 3/2 \\ - \\ - \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
8537,98 8523,88 8473,31 8464,92 8432,37	3 100 4 1	17,37 17,16 20,07 18,62	18,82 18,62 21,53 20,09	$5p^{2}P^{\circ}-4d'^{2}P$ $-5p^{4}D^{\circ}-4d'^{2}D$ $6s^{4}P-5f'^{2}P^{\circ}$ $5p'^{2}P^{\circ}-6s'^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8411,14 8378,87 8333,14 8202,72 8178,68	1 2 2 200 2	20,06 — 15,86 —	21 ,53 — 17 ,37 —	$5d ^4D - 5f' ^2P^\circ$ $4d ^4F - 5p ^2D^\circ$ $5s' ^2D - 5p ^2D^\circ$	$^{3/_{2}-^{3/_{2}}}$ $^{-}$ $^{7/_{2}-^{5/_{2}}}$ $^{-}$ $^{5/_{2}-^{5/_{2}}}$
8157,25 8147,70 8145,15 8142,17 8132,96	10 1 100 1 6	15,85 21,15 15,85 20,01 18,49	17,37 22,67 17,37 21,53 20,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ - \end{array}$
8130,03 8123,44 8095,96 7993,22 7973,62	10 4 3 200 120	16,08 — 15,10 15,82	17,60 — 16,65 17,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
7957,07 7931,41 7956,52 7791,90 7781,97	3 40 30 6 100	15,82 17,00 17,25 18,62	17,38 18,56 18,82 20,21	$5s' ^{2}D - 5p ^{4}D^{\circ}$ $4d ^{2}F - 5p' ^{2}F^{\circ}$ $5p ^{2}P^{\circ} - 4d' ^{2}P$ $5p' ^{2}P^{\circ} - 5d ^{4}D$ $-$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 3/2 - 2/2 \\ - \\ 1/2 - 3/2 \end{array} $
7749 ,16 7735 ,69	$\begin{array}{c} 1 \\ 250 \end{array}$	18,87 15,00	20,47 16,60	5p' 2P°—5d 2P 4d 4D—5p 4P°	$\frac{1}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{5}{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
7641 ,16 7635 ,13 7629 ,46	150 5 5	17,25 20,01 17,00	18,87 21,63 18,62	5p ² P°—4d′ ² P 5d ⁴ P—5f′ ² P° 4d ² F—5p′ ² P°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
7615,69 7515,48 7524,46 7467,99	$\begin{array}{c} 3 \\ 20 \\ 300 \\ 6 \end{array}$	15,00	16,65	- 4d ⁴ D-5p ⁴ P°	3/2-3/2
7435,78 7434,74 7407,02 7359,97	200 15 400 3	16,87 17,16 14,93	18,54 18,82 16,60	5p ⁴ D°—4d′ ² D 5p ⁴ D°—4d′ ² P 4d ⁴ D—5p ⁴ P° —	$ \begin{array}{r} ^{5/2} - ^{5/2} \\ ^{3/2} - ^{3/2} \\ ^{5/2} - ^{5/2} \\ $
7301,29 $7289,78$ $7272,97$	4 400 4	14,90 17,17	16,60 18,87	$-4d ^4D - 5p ^4P^{\circ} \\ 2 - 5p' ^2P^{\circ}$	$-{7/2}$ $-\frac{5}{2}$ $3/2$ $-\frac{1}{2}$
7241,56 7233,52 7213,13 7156,81	2 1 250	$ \begin{array}{c} 17,16 \\ 17,17 \\ 44,93 \\ 45,85 \end{array} $	18,87 18,88 16,65 17,57	$5p ^4D^{\circ} - 4d' ^2P$ $2 - 5p' ^2D^{\circ}$ $4d ^4D - 5p ^4P^{\circ}$ $5s' ^2D - 5p ^4S^{\circ}$ $4d' ^2P - 1^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
7130,31 7139,99 7078,44 7073,97 7022,56 6977,95	1 60 3 60 2 3	18,87 15,10 15,82 15,85 18,62 18,82	20,60 16,83 17,57 17,60 20,39 20,60	$4d^{-2}P-1$ $4d^{-4}D-5p^{-4}P^{\circ}$ $5s'^{-2}D-5p^{-4}S^{\circ}$ $5s'^{-2}D-5p^{-2}D^{\circ}$ $5p'^{-2}P^{\circ}-6s''^{-2}S$ $4d'^{-2}P-1^{\circ}$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 1/_2 - 1/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 3/_2 - 3/_2 \end{array} $
6944,06 6870,85 6771,22 6764,43 6763,61	10 40 50 80 100	{ 16,83 15,82 16,69 15,82 15,00 15,00	18,62 17,60 18,49 17,65 16,83 16,83	$5p ^4P^{\circ}$ $- 4d' ^2D$ $5s' ^2D$ $- 5p ^2D^{\circ}$ $4d ^2P$ $- 5p' ^2F^{\circ}$ $5s' ^2D$ $- 5p ^2S^{\circ}$ $5s ^2P$ $- 5p ^4P^{\circ}$ $4d ^4D$ $- 5p ^4P^{\circ}$	$\begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array}$
6634,36 6627,96 6624,22 6605,00 6602,90	15 2 2 15 10	15,00 17,60 17,00 16,68 17,00	16,87 19,47 18,87 18,56 18,87	$4d\ ^4D - 5p\ ^4D^{\circ} \ 5p\ ^2D^{\circ} - 6s\ ^4P \ 4d\ ^2F - 5p'\ ^2D^{\circ} \ 4d\ ^2D - 5p'\ ^2F^{\circ} \ 4d\ ^2F - 5p'\ ^2P^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 5/2 - 1/2 \end{array} $
6570,07 6565,32 6510,95 6510,14 6493,7	150 6 100 8 2	17,00 16,65 14,93 17,57 20,82	18,88 18,54 16,83 19,47 22,73	$4d^{2}F - 5p'^{2}D^{\circ}$ $5p^{4}P^{\circ} - 4d'^{2}D$ $4d^{4}D - 5p^{4}D^{\circ}$ $5p^{4}S^{\circ} - 6s^{4}P$ $5d^{2}D - 13^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
6470,89 6440,74 6420,18 6416,61 6412,53	$50 \\ 5 \\ 300 \\ 60 \\ 4$	14,69 17,65 14,90 16,69 16,60	16,60 19,57 16,83 18,62 18,54	$5s^{2}P - 5p^{4}P^{\circ}$ $5p^{2}S^{\circ} - 6s^{4}P$ $4d^{4}D - 5p^{4}D^{\circ}$ $4d^{2}P - 5p'^{2}P^{\circ}$ $5p^{4}P^{\circ} - 4d'^{2}D$	$ \begin{array}{c} 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 7/_2 - 7/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 5/_2 \end{array} $
6409,84 6404,69 6394,28 6391,14 6344,61	10 3 4 30 4	18,88 16,68 14,93 16,87	20,82 	$5p'\ ^{2}D^{\circ}$ $-5d\ ^{2}D$ $-4d\ ^{2}D$ $-5p'\ ^{2}P^{\circ}$ $4d\ ^{4}D$ $-5p\ ^{4}D^{\circ}$ $5p\ ^{4}D^{\circ}$ $-4d'\ ^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6322,42 6303,66 6290,96 6257,84 6230,74	4 100 3 4 10	14,69 14,90 16,65 18,62 18,63	16,65 16,87 18,62 20,60 18,82	$5s^{2}P-5p^{4}P^{\circ}$ $4d^{4}D-5p^{4}D^{\circ}$ $5p^{4}P^{\circ}-4d^{\prime}^{2}D$ $4d^{\prime}^{2}D-1^{\circ}$ $5p^{4}P^{\circ}-4d^{\prime}^{2}P$	$ \begin{array}{c} 3/2 - 3/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
6228,14 6196,14 6185,35	1 3 7	$\frac{19,47}{17,57}$	21,46 19,57	$\frac{6s ^4P - 5f' ^2F^{\circ}}{5p ^4S^{\circ} - 6s ^4P}$	

					
λ. Å	I	E _H , eV	E _B , eV	Transition	J
6171,77 6168,80	6 50	18,87 16,48	20,88 18,49	$^{4}d^{\prime}^{2}P$ $^{-}5f^{4}F^{\circ}$ $^{4}d^{2}D$ $^{-}5p^{\prime}^{2}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
6150,54 6119,56	1 10	16,60 —	18,62	5p ⁴ P°—4d′ ² D —	⁵ / ₂ — ³ / ₂
6112,61	4	$\begin{cases} 20,70 \\ 18,82 \end{cases}$	$22,73 \\ 20,85$	$\frac{5d^{2}P-13^{\circ}}{4d'^{2}P-5f^{4}F^{\circ}}$	$\frac{1}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
6107,61 6094,50	$\begin{array}{c} 5 \\ 30 \end{array}$	16,83	18,87	5p ⁴ P°—4d′ ² P	
6079,71 6047,13 6046,06 6040,7	20 1 10 10	18,87 18,87 — —	20,91 20,92 — —	$4d' {}^{2}P - 5f {}^{2}D^{\circ} \ 4d' {}^{2}P - 5f {}^{4}D^{\circ} \ - \ - \ 4d' {}^{2}P - 5f {}^{4}F^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6038,1 $6022,39$	1 40	18,82 15,10	20,88 17,16	$4d~^2D$ – $5p~^4D^\circ$	$^{1}/_{2}$ — $^{3}/_{2}$
6009,99 6008,10 5992,22 5974,82	$ \begin{array}{r} 10 \\ 3 \\ 200 \\ 2 \end{array} $	18,82 18,54 14,58 16,48	20,89 20,60 16,65 18,56	$4d' {}^{2}P - 5f {}^{2}F^{\circ}$ $4d' {}^{2}D - 1^{\circ}$ $5s {}^{4}P - 5p {}^{4}P^{\circ}$ $1 - 5p' {}^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 7/2 \end{array} $
5967 ,54 5949 ,93 5941 ,82	$\begin{array}{c} 15 \\ 3 \\ 4 \end{array}$	18,87 18,82	20,94 20,91	4d' ² P - 5p" ² P° 4d' ² P - 5f ² D°	$^{1/2}_{^{3/2}_{^{-3/2}}}$
5935,03 5918,81	8 2	18,62 18,82	$20,71 \\ 20,92$	$\frac{5p' ^2P^{\circ} - 5d ^4F}{4d' ^2P - 5f ^4D^{\circ}}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5911,72 5900,89 5894,56 5860,75 5854,04	10 8 8 10 4	17,37 17,37 —	19,47 19,47 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3/2—5/2 5/2—5/2 —————————————————————————
5842,49 5801,81 5800,16 5777,72 5773,5	1 1 6 2 1	18,82 16,48 16,48 18,70 18,62	20,94 18,62 18,62 20,84 20,77	$4d' ^{2}P - 5p'' ^{2}P^{\circ} \ 1 - 5p' ^{2}P^{\circ} \ 4d ^{2}D - 5p' ^{2}P^{\circ} \ 4d' ^{2}F - 5f ^{4}F^{\circ} \ 5p' ^{2}P^{\circ} - 5d ^{2}F$	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array}$
5771 ,41 5755 ,60 5752 ,98 5749 ,27 5699 ,84	100 2 60 5 10	15,10 $18,70$ $15,00$ $18,88$ $16,65$ $16,32$	17,25 20,85 17,16 21,04 18,82 18,49	$\begin{array}{c} 4d\ ^4D - 5p\ ^2P^\circ \\ 4d'\ ^2F - 5f\ ^4F^\circ \\ 5s\ ^2P - 5p\ ^4D^\circ \\ 5p'\ ^2D^\circ - 5d\ ^2D \\ 5p\ ^4P^\circ - 4d'\ ^2P \\ 4d\ ^2F - 5p'\ ^2F^\circ \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
5692,11 5690,35 5681,89 5674,52 5672,78	5 200 400 30 40	16,69 14,69 16,69 16,68	18,87 16,87 18,87 18,87	$ (d^{2}P-5p'^{2}D^{\circ})$ $5s^{2}P-5p^{4}D^{\circ})$ $4d^{2}P-5p'^{2}P^{\circ})$ $4d^{2}D-5p'^{2}D^{\circ})$	$ \begin{array}{c} - \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
5664,85 5650,37 5648,38 5645,00 5641,07	1 10 1 1 3	18,70 16,69 20,47 18,62 17,38	20,89 18,88 22,67 20,82 19,57	$4d' ^2F - 5f ^2F^{\circ}$ $4d ^2P - 5p' ^2D^{\circ}$ $5d ^2P - 11^{\circ}$ $5p' ^2P - 5d ^2D$ $5p ^4D^{\circ} - 6s ^4P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
5633,02 5627,02 5617,63 5585,4 5584,4	100 1 2 1 1	16,68 17,37 17,37 16,29 16,65 16,60	18,88 19,57 19,57 18,49 18,87 18,82	$4d^{2}D - 5p'^{2}D^{\circ}$ $5p^{2}P^{\circ} - 6s^{4}P$ $5p^{2}D^{\circ} - 6s^{4}P$ $4d^{4}D - 5p'^{2}F^{\circ}$ $5p^{4}P^{\circ} - 4d'^{2}P$ $5p^{4}P^{\circ} - 4d'^{2}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \end{array} $
5568,65 5552,99 5546,11	100 100 5	14,93 18,62 20,39	17,16 20,85 22,62	$4d\ ^4D - 5p\ ^4D^{\circ}$ $4d'\ ^2D - 5f\ ^4F^{\circ}$ $6s''\ ^2S - 8^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $

λ. Å	I	E _H , eV	E _B , eV	Transition	J
5541,65 5532,29	4 5	20,39 16,32	22,62 18,56	6s" ² S—9° 4d ² F—5p' ² F°	$\frac{1}{7}$, $\frac{1}{2}$, $\frac{1}{2}$
5523,47 5522,94 5499,54 5491,43 5476,46	30 60 50 4 4	15,00 15,00 14,58 18,62 18,88	17,25 17,25 16,83 20,88 21,15	$5s^{2}P - 5p^{2}P^{\circ}$ $4d^{4}D - 5p^{2}P^{\circ}$ $5s^{4}P - 5p^{4}P^{\circ}$ $4d'^{2}D - 5f^{4}F^{\circ}$ $5p'^{2}D^{\circ} - 6s'^{2}D$	1/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $1/2 - 1/2$ $5/2 - 5/2$
547,549 546,817 5449,61 5446,34 5439,38	200 2 80 1	18,58 18,62 18,49 15,10 18,87	20,84 20,89 20,77 17,37 21,15	$4d' {}^{2}F - 5f {}^{4}F^{\circ}$ $4d' {}^{2}D - 5f {}^{2}F^{\circ}$ $5p' {}^{2}F^{\circ} - 5d {}^{2}F$ $4d {}^{4}D - 5p {}^{2}P^{\circ}$ $5p' {}^{2}D^{\circ} - 6s' {}^{2}D$	7/2 $3/2$ $5/2$ $5/2$ $5/2$ $1/2$ $3/2$ $5/2$
5438,63 5433,24 5423,56 5418,43 5373,19	40 2 1 30 3	15,10 18,58 17,65 18,62 18,58	17,38 20,86 19,94 20,91 20,89	$4d\ ^4D - 5p\ ^4D^\circ \ 4d'\ ^2F - 5f\ ^2F^\circ \ 5p\ ^2S^\circ - 5d\ ^4P \ 4d'\ ^2D - 5f\ ^2D^\circ \ 4d'\ ^2F - 5f\ ^2F^\circ \ $	$^{1}/_{2}$ $^{7}/_{2}$ $^{7}/_{2}$ $^{7}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{1}/_{2}$ $^{3}/_{2}$ $^{3}/_{2}$ $^{5}/_{2}$
5355,45 5346,76 5333,41 5329,15 5322,77	10 60 500 4 60	18,54 17,16 18,54 18,62 17,25	20,85 19,47 20,86 20,94 19,57	$4d'\ ^{2}D-5f\ ^{4}F^{\circ}\ 5p\ ^{4}D^{\circ}-6s\ ^{4}P\ 4d'\ ^{2}D-5f\ ^{2}F^{\circ}\ 4d'\ ^{2}D-5p''\ ^{2}P^{\circ}\ 5p\ ^{2}P^{\circ}-6s\ ^{4}P$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
5317,41 5310,26 5308,66 5297,8 5276,50	30 4 200 1 100	17,60 16,29 14,27 18,54 18,54	19,94 18,62 16,60 20,88 20,89	$5p ^2D^{\circ} - 5d ^4P$ $4d ^4P - 5p' ^2P^{\circ}$ $5s ^4P - 5p ^4P^{\circ}$ $4d' ^2D - 5f ^4F^{\circ}$ $4d' ^2D - 5f ^2F^{\circ}$	3/2 - 1/2 $5/2 - 3/2$ $3/2 - 5/2$ $5/2 - 3/2$ $5/2 - 5/2$
5256,75 5249,06 5245,25 5241,29	$\begin{array}{c} 30 \\ 4 \\ 4 \\ 2 \end{array}$	17,60 17,65 — 17,57	19,96 20,01 — 19,94	$5p ^2D^{\circ} - 5d ^4P$ $5p ^2S^{\circ} - 5d ^4P$ - $5p ^4S^{\circ} - 5d ^4P$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 3/2 \\ - \\ 3/2 - 1/2 \end{array} $
5230 ,15 5229 ,52 5225 ,05	3 60 3	18,54 15,00	20,91 17,37	$4d' ^2D - 5f ^2D^\circ \ 4d ^4D - 5p ^2D^\circ \ 5s ^2P - 5p ^2P^\circ$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
5224,56 5217,93 5217,45	7 12 30	15,00 15,00 15,00 15,00	17,37 17,37 17,38 17,38	$3s^{2}P - 3p^{2}P^{2}$ $4d^{4}D - 5p^{2}P^{\circ}$ $5s^{2}P - 5p^{4}D^{\circ}$ $4d^{4}D - 5p^{4}D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
5208,32 5201,56 5200,22 5186,99 5182,30	500 2 60 60 1	14,27 16,48 16,48 16,48 17,57	16,65 18,87 18,87 18,87 19,96	$5s ext{ }^4P - 5p ext{ }^4P^\circ \ 1 - 5p' ext{ }^2D^\circ \ 4d ext{ }^2D - 5p' ext{ }^2D^\circ \ 4d ext{ }^2D - 5p' ext{ }^2P^\circ \ 5p ext{ }^4S^\circ - 5d ext{ }^4P$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \end{array} $
5177,71 5166,80 5152,01	6 80 3	16,23 16,48	18,62 18,88 —	4d ⁴ P—5p′ ² P° 4d ² D—5p′ ² D° —	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
5149,61 5145,28 5143,05	3 4 60	17,60 16,09 17,65	20,01 18,49 20,06	$5p ^2D^{\circ} - 5d ^4P \ 4d ^4F - 5p' ^2F^{\circ} \ 5p ^2S^{\circ} - 5d ^4D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
5141 ,10 5133 ,52 5125 ,73 5123 ,16	$egin{array}{c} 1 \\ 1 \\ 400 \\ 15 \end{array}$	20,21 16,08 17,16 17,65	22,62 18,49 19,57 20,07	$5d ^4D - 9^{\circ}$ $4d ^4F - 5p' ^2F^{\circ}$ $5p ^4D^{\circ} - 6s ^4P$ $5p ^2S^{\circ} - 6s ^4P$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
5086,52 5078,19 5077,23 5075,92 5072,55	250 2 40 4 40	18,88 17,57 14,93 17,65 14,93	21,32 20,01 17,37 20,09 17,37	$5p' \ ^2D^{\circ} - 4d'' \ ^2D$ $5p \ ^4S^{\circ} - 5d \ ^4P$ $4d \ ^4D - 5p \ ^2D^{\circ}$ $5p \ ^2S^{\circ} - 6s \ ^2P$ $4d \ ^4D - 5p \ ^2P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \end{array} $
5067,41 5067,22	3	17,57	20,02	5p 4S°—5d 4D	$\frac{\frac{3}{2}-\frac{3}{2}}{-\frac{3}{2}}$

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λ, λ	I	$E_{\rm H}$, eV	$E_{\rm B}$, eV	Transition	J
5065,58 5054,53 5047,52	20 30 4	$ \begin{array}{c} 18,88 \\ 20,21 \\ 18,87 \\ 17,60 \end{array} $	21,33 22,66 21,32 20,06	5p' 2D°-4d" 2D 5d 4D-10° 5p' 2D°-4d" 2D 5p 2D°-5d 4D	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
5046,31 5033,85 5028,36 5022,40 5021,88	80 100 30 200 100	18,87 18,87 17,60 14,69 14,90	21,33 21,33 20,07 17,16 17,37	$5p'\ ^2P^\circ - 4d''\ ^2D \ 5p'\ ^2D^\circ - 4d''\ ^2D \ 5p\ ^2D^\circ - 6s\ ^4P \ 5s\ ^2P - 5p\ ^4D^\circ \ 4d\ ^4D - 5p\ ^2D^\circ$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \end{array} $
5020,43 5015,71 5013,29 4998,54 4997,22	4 1 100 5 1	20,15 20,21 15,10 18,56 16,08	22,62 22,68 17,57 21,04 18,56	$6s^{2}P-9^{\circ} \ 5d^{4}D-12^{\circ} \ 4d^{4}D-5p^{4}S^{\circ} \ 5p'^{2}F^{\circ}-5d^{2}D \ 4d^{4}F-5p'^{2}F^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 7/2 \end{array} $
4982,83 4978,89 4960,25 4948,50 4945,59	50 100 100 50 300	17,60 17,57 17,57 17,65 15,10	20,09 20,06 20,07 20,15 17,60	$5p ^2D^{\circ} - 6s ^2P$ $5p ^4S^{\circ} - 5d ^4D$ $5p ^4S^{\circ} - 6s ^4P$ $5p' ^2S^{\circ} - 6s ^2P$ $4d ^4D - 5p ^2D^{\circ}$	3/2 - 3/2 $3/2 - 3/2$ $3/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$
4937,97 4915,94 4914,62 4908,34 4897,2	1 100 2 2 2 3	20,15 17,57 18,08 18,62	22,66 20,09 20,60 21,15	$6s^{2}P-10^{\circ}$ $5p^{4}S^{\circ}-6s^{2}P$ $5s''^{2}S-1^{\circ}$ $5p'^{2}P^{\circ}-6s'^{2}D$ $-$	$^{1/2}$ _{3/2}_{3/2}_{3/2}_{1/2}_{2}_{3/2}_{5/2}_{5/2}_{-}_{5/2}
4875,63 4870,14 4857,20 4852,61 4846,60	1 20 150 2 700	16,08 18,87 15,10 20,07 14,69	18,62 21,41 17,65 22,62 17,25	$4d\ ^4F - 5p'\ ^2P^\circ \ 4d'\ ^2P - 5j'\ ^2D^\circ \ 4d\ ^4D - 5p\ ^2S^\circ \ 6s\ ^4P - 9^\circ \ 5s\ ^2P - 5p\ ^2P^\circ \ $	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
4845,14 4839,04 4836,56 4833,68 4832,07	2 4 20 4 800	17,38 17,37 17,65 16,32 14,27	19,94 19,94 20,21 18,88 16,83	$5p ^4D^{\circ} - 5d ^4P$ $5p ^2P^{\circ} - 5d ^4P$ $5p ^2S^{\circ} - 5d ^4D$ $4d ^2F - 5p' ^2D^{\circ}$ $5s ^4P - 5p ^4P^{\circ}$	1/2 - 1/2 $3/2 - 1/2$ $1/2 - 1/2$ $7/2 - 5/2$ $3/2 - 1/2$
4825,18 4811,76 4802,97 4796,33 4791,15	300 300 4 60 3	15,00 14,58 16,29 17,57 18,56	17,57 17,16 18,87 20,15 21,15	$5s ^{2}P - 5p ^{4}S^{\circ}$ $5s ^{4}P - 5p ^{4}D^{\circ}$ $4d ^{4}P - 5p' ^{2}D^{\circ}$ $5p ^{4}S^{\circ} - 6s ^{2}P$ $5p ^{2}F^{\circ} - 6s' ^{2}D$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 7/_2 - 5/_2 \end{array} $
4788,76 4784,8 4774,46 4773,01 4765,74	5 1 2 40 1000	17,37 17,37 16,29 18,82 14,27	19,96 19,96 18,88 21,42 16,87	$5p {}^{2}P^{\circ} - 5d {}^{4}P$ $5p {}^{2}D^{\circ} - 5d {}^{4}P$ $4d {}^{4}P - 5p' {}^{2}D^{\circ}$ $4d' {}^{2}P - 5f' {}^{2}D^{\circ}$ $5s {}^{4}P - 5p {}^{4}D^{\circ}$	3/2 - 5/2 $ 5/2 - 5/2 $ $ 5/2 - 5/2 $ $ 3/2 - 5/2 $ $ 3/2 - 5/2$
4762,43 4758,77 4752,02 4739,00 4706,31	300 1 100 3000 3	15,00 16,87 17,60 13,99 15,86	17,60 19,47 20,21 16,60 18,49	$5s {}^{2}P - 5p {}^{2}D^{\circ}$ $5p {}^{4}D^{\circ} - 6s {}^{4}P$ $5p {}^{2}D^{\circ} - 5d {}^{4}D$ $5s {}^{4}P - 5p {}^{4}D^{\circ}$ $4d {}^{4}F - 5p' {}^{2}F^{\circ}$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 5/_2 - 5/_2 \\ 3/_2 - 1/_2 \\ 5/_2 - 5/_2 \\ 7/_2 - 5/_2 \end{array} $
4705 ,44 4699 ,69 4695 ,66 4694 ,44	2 30 50 200	$ \begin{array}{c} 17,38 \\ 17,37 \\ 17,37 \\ 16,23 \\ 16,83 \\ \end{array} $	20,01 20,01 20,01 18,87 19,47	$5p {}^{4}D^{\circ} - 5d {}^{4}P$ $5p {}^{2}P^{\circ} - 5d {}^{4}P$ $5p {}^{2}D^{\circ} - 5d {}^{4}P$ $4d {}^{4}P - 5p' {}^{2}D^{\circ}$ $5p {}^{4}D^{\circ} - 6s {}^{4}P$	$1/_{2}$ $-3/_{2}$ $3/_{2}$ $-3/_{2}$ $5/_{2}$ $-3/_{2}$ $3/_{2}$ $-3/_{2}$ $7/_{2}$ $-5/_{2}$ $3/_{2}$ $-1/_{2}$
4691,28	100	{ 17,57 15,85	20,21 18,49	$5p^{4}S^{\circ} - 5d^{4}D$ $5s'^{2}D - 5p'^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
4688 ,3 4687 ,28 4686 ,30	$egin{smallmatrix} 3 \\ 10 \\ 8 \end{bmatrix}$	18,88 18,82 17,37	21,53 21,47 20,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{5}{2}$

			λ,		
λ, Å	I	E _H , eV	E _B , eV	Transition	J
4683,68 4680,41	5 500	$ \begin{array}{c} 16,23 \\ 20,02 \\ 15,00 \end{array} $	18,87 22,66 17,65	$4d\ ^4P-5p'\ ^2P^{\circ}\ 5d\ ^4D-10^{\circ}\ 5s\ ^2P-5p\ ^2S^{\circ}$	$^{3/2}_{5/2}$ $^{-1/2}_{3/2}$ $^{1/2}_{1/2}$ $^{-1/2}$
4673,80 4672,09 4658,87 4650,17 4637,66	$\begin{array}{c} 3 \\ 2 \\ 2000 \\ 30 \\ 1 \end{array}$	20,02 18,49 13,99 14,58 20,00	22,67 21,15 16,65 17,25 22,67	$5d\ ^4D-11^{\circ}$ $5p'\ ^2F^{\circ}-6s\ ^2D$ $5s\ ^4P-5p\ ^4P^{\circ}$ $5s\ ^4P-5p\ ^2P^{\circ}$ $5d\ ^4D-11^{\circ}$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 7/2 - 5/2 \end{array}$
4635,42 4633,88 4619,99 4619,15 4615,28	8 800 5 1000 500	14,93 15,82 17,38 14,69 14,69	17,60 18,49 20,06 17,37 17,37	$\begin{array}{c} 4d\ ^4D - 5p\ ^2D^{\circ} \\ 5s'\ ^2D - 5p'\ ^2F^{\circ} \\ 5p\ ^4D^{\circ} - 5d\ ^4D \\ 5s\ ^2P - 5p\ ^2D^{\circ} \\ 5s\ ^2P - 5p\ ^2P^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
4614,50 4613,79 4610,65 4609,72 4608,48	15 2 60 20 1	17,37 $19,94$ $19,94$ $17,37$ $14,69$ $17,25$	20,06 22,62 22,62 20,06 17,38 19,94	$5p ^{2}P^{\circ} - 5d ^{4}D$ $5d ^{4}P - 8^{\circ}$ $5d ^{4}P - 9^{\circ}$ $5p ^{2}D^{\circ} - 5d ^{4}D$ $5s ^{2}P - 5p ^{4}D^{\circ}$ $5p ^{2}P^{\circ} - 5d ^{4}P$	3/2 $3/2$ $1/2$ $3/2$ $1/2$ $1/2$ $1/2$ $1/2$ $5/2$ $3/2$ $3/2$ $1/2$ $1/2$ $1/2$ $1/2$
4604,02 4601,42 4598,49 4592,80 4591,50	60 1 50 150 1	17,38 16,18 17,37 18,62 15,86	20,07 18,87 20,07 21,32 18,56	$5p ^4D^{\circ}$ — $6s ^4P$ $4d ^4P$ — $5p' ^2P^{\circ}$ $5p ^2P^{\circ}$ — $6s ^4P$ $5p' ^2P^{\circ}$ — $4d'' ^2D$ $4d ^4F$ — $5p' ^2F^{\circ}$	1/2 - 1/2 $1/2 - 1/2$ $3/2 - 1/2$ $3/2 - 5/2$ $7/2 - 7/2$
4582,85 4580,11 4577,20 4575,8 4573,33	300 2 800 1 30	16,87 19,96 15,85 18,62 18,82	19,57 22,67 18,56 21,33 21,53	$5p ^4D^{\circ} - 6s ^4P$ $5d ^4P - 11^{\circ}$ $5s' ^2D - 5p' ^2F^{\circ}$ $5p' ^2P^{\circ} - 4d'' ^2D$ $4d' ^2P - 5f' ^2P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4565,82 4564,9 4560,38 4556,61 4552,77	1 1 3 200 3	17,38 20,01 17,37 17,37 18,70	20,09 22,73 20,09 20,09 21,42	$5p ^4D^{\circ} - 6s ^2P$ $5d ^4P - 13^{\circ}$ $5p ^2P^{\circ} - 6s ^2P$ $5p ^2D^{\circ} - 6s ^2P$ $4d' ^2F - 5f' ^2D^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
4528,62 4523,14 4489,88 4488,22 4481,85	$\begin{array}{c} 3 \\ 400 \\ 400 \\ 3 \\ 50 \end{array}$	17,65 16,83 18,56 — 17,25	20,39 19,57 21,32 — 20,01	$5p \ ^2S^{\circ} - 6s'' \ ^2S$ $5p \ ^4P^{\circ} - 6s \ ^4P$ $5p' \ ^2F^{\circ} - 4d'' \ ^2D$ $ 5p \ ^2P^{\circ} - 5d \ ^4P$	$1/_{2}$ $1/_{2}$ $3/_{2}$ $7/_{2}$ $5/_{2}$ $-1/_{2}$ $3/_{2}$
4479,86 4475,00 4460,45 4459,99 4457,25	5 800 1 8 40	15,85 15,85 17,37 17,16 17,37	18,62 18,62 20,15 19,94 20,15	$4d' {}^{2}P - 5f' {}^{2}P^{\circ}$ $6s' {}^{2}D - 5p' {}^{2}P^{\circ}$ $5p {}^{2}D^{\circ} - 5d {}^{4}F$ $5p {}^{4}D^{\circ} - 5d {}^{4}P$ $5p {}^{2}P^{\circ} - 6s {}^{2}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4454,37 4453,21 4450,34 4443,72 4436,81	10 50 4 3 600	17,60 18,08 — 16,09 14,58	20,39 20,86 — 18,87 17,37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 1/2 \\ - \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
4431,67 4428,9 4422,70 4420,16 4417,24 4408,89 4404,33 4400,87 4399,39	500 1 100 1 40 40 30 100 15	14,58 16,09 15,82 16,08 17,16 18,82 17,25 17,57	17,38 18,88 18,62 18,88 19,96 21,63 20,06 20,39	$5s ^4P - 5p ^4D^{\circ}$ $4d ^4F - 5p' ^2D^{\circ}$ $5s' ^2D - 5p' ^2P^{\circ}$ $4d ^4F - 5p' ^2D^{\circ}$ $5p ^4D^{\circ} - 5d ^4P$ $4d' ^2P - 5f' ^2P^{\circ}$ $5p ^4S^{\circ} - 6s'' ^2S$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ \\ \\ \\ \end{array} $
4389,72 548	20	17,25	20,07	5p ² P°—6s ⁴ P	$^{1}/_{2}$ — $^{1}/_{2}$

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λ, λ	l	E _{II} , eV	$E_{\rm B}$, eV	Transition	J
4388,90 4386,54 4385,27 4381,52 4377,71	3 300 50 400	17,65 16,65 18,49 18,08	20,47 19,47 21,32 20,91	5p ² S°—5d ² P 5p ⁴ P°—6s ⁴ P 5p' ² F°—4d" ² I) 5s" ² S—5f ² I)° —	$^{1/2}_{-}^{-}^{3/2}_{2}$ $^{3/2}_{-}^{5/2}_{2}$ $^{5/2}_{-}^{5/2}_{2}$ $^{1/2}_{-}^{3/2}$
4371,25 4369,69 4366,26 4364,61 4355,47	$ \begin{array}{r} 20 \\ 200 \\ 6 \\ 4 \\ 3000 \end{array} $	17,38 18,49 17,37 18,08 13,99	20,21 21,33 20,21 20,92 16,83	$5p ^4D^{\circ}$ — $5d ^4D$ $5p' ^2F^{\circ}$ — $4d'' ^2D$ $5p ^2P^{\circ}$ — $5d ^4D$ $5s'' ^2S$ — $5f ^4D^{\circ}$ $5s ^4P$ — $5p ^4D^{\circ}$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 5/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \end{array} $
4351,02 4341,33 4333,34 4331,24 4322,98	40 8 50 80 150	18,62 17,16 17,16 17,60 18,08	21,47 20,01 20,02 20,47 20,94	$4d' {}^{2}D - 5f' {}^{2}F^{c}$ $5p {}^{4}D^{o} - 5d {}^{4}P$ $5p {}^{4}D^{o} - 5d {}^{4}D$ $5p {}^{2}D^{o} - 5d {}^{4}F$ $5s'' {}^{2}S - 5p'' {}^{2}P^{c}$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
4319,12 4317,81 4305,81 4301,53 4300,49	500 3 40 200	17,60 16,60 	20,47 $19,47$ $ 16,87$ $17,57$	$\begin{array}{c} 5p \ ^2D^{\circ} - 5d \ ^2P \\ 5p \ ^4P^{\circ} - 6s \ ^4P \\ - \\ 5s \ ^4P - 5p \ ^4D^{\circ} \\ 5s \ ^2P - 5p \ ^4S^{\circ} \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 5/2 \\ - \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
4295,21 4292,92 4287,45 4285,40 4280,61	8 600 4 4 5	14,27 — — 17,57	$\frac{17.46}{20.47}$	$5s {}^{4}P - 5p {}^{4}D^{c}$ $=$ $5p {}^{4}S^{\circ} - 5d {}^{4}F$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4273,48 4268,81 4268,57 4260,85 4259,44	4 100 60 5 80	17,57 17,16 17,25	20,47 20,06 20,45	5p 4S°—5d 2P 5p 4D°—5d 4D 5p 2P°—6s 2P —	$ \begin{array}{c} - \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ - \\ 3/4 - 1/4 \end{array} $
4254,85 4252,67 4250,58 4236,64 4229,21	100 50 150 100 8	17,16 18,62 14,69 16,65	20,07 21,53 17,60 19,57	$5p ^4D^{\circ} - 6s ^4P$ $4d' ^2D - 5f' ^2P^{\circ}$ $5s ^2P - 5p ^2D^{\circ}$ $5p ^4P^{\circ} - 6s ^4P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ - \end{array} $
4228,79 4222,20 4217,88 4210,67 4240,31	$ \begin{array}{c} 20 \\ 20 \\ 2 \\ 25 \\ 3 \end{array} $	18,54 17,16 15,62 —	21,47 20,09 18,56 —	$4d' ^2D - 5f' ^2F^\circ \ 5\rho ^4D^\circ - 6s ^2P \ 4d ^4F - 5p' ^2F^\circ \ - \ - \ - \ -$	$ \begin{array}{c} 5/_2 - 5/_2 \\ 3/_2 - 3/_2 \\ 9/_2 - 7/_2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
4201,42 4185,12 4179,58 4177,02 4172,51	$\begin{array}{c} 30 \\ 50 \\ 20 \\ 3 \\ 20 \end{array}$	18,88 14,69 18,87 — 16,60	21,83 17,65 21,83 — 19,57	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ - 5/2 - 3/2 \end{array} $
4163,82 4159,00 4145,12 4139,11 4137,96	2 4 250 100 50	14,27 	17,25 17,57 —	5s ⁴ P—5p ² P° ————————————————————————————————————	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4135,86 4133,68 4118,14 4113,73 4110,16	3 5 30 8 5	18,54 17,16 17,38 17,37 18,62	21,53 20,15 20,39 20,39 21,63	$4d' ^{2}D - 5f' ^{2}P^{\circ}$ $5p ^{4}D^{\circ} - 6s ^{2}P$ $5p ^{4}D^{\circ} - 6s'' ^{2}S$ $5p ^{2}P^{\circ} - 6s'' ^{2}S$ $4d' ^{2}D - 5f' ^{2}P^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \end{array} $
4109,23 4099,71 4098,72	100 3 250	15,85 15,86 14,58	18,87 18,88 17,60	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} {}^{5/2} - {}^{3/2} \\ {}^{7/2} - {}^{5/2} \\ {}^{1/2} - {}^{3/2} \end{array}$

λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
4088,33 4081,40	500	15,85 18,21	18,88 21,25	5s' ² D — 5p' ² D° 4d' ² G — 5°	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4066,09 4065,11 4057,01 4050,42 4044,67	6 300 300 50 80	15,82 15,82 17,65 15,82	18,87 18,87 20,71 18,88	$-5s'\ ^2D-5p'\ ^2D^\circ \ 5s'\ ^2D-5p'\ ^2P^\circ \ 5p\ ^2S^\circ-5\ell\ell\ ^4F \ 5s'\ ^2D-5p'\ ^2D^\circ$	$\begin{array}{c} - \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
4037,83 4008,48 4008,08 4005,57 3997,95	30 40 25 30 100	14,58 $17,37$ $16,87$ $17,37$ $17,60$ $17,37$	17,65 20,47 19,96 20,47 20,70 20,47	$5s ^4P - 5p ^2D^{\circ}$ $5p ^2P^{\circ} - 5d ^4F$ $5p ^4D^{\circ} - 5d ^4P$ $5p ^2D^{\circ} - 5d ^4F$ $5p ^2D^{\circ} - 3$ $5p ^2P^{\circ} - 5d ^2P$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
3996,69 3994,83 3991,94 3990,66 3987,78	3 100 15 15 25	16,83 14,27 14,27 17,60 14,27	19,94 17,37 17,37 20,71 17,38	$5p^{4}P^{\circ}-5d^{4}P$ $5s^{4}P-5p^{2}D^{\circ}$ $5s^{4}P-5p^{2}P^{\circ}$ $5p^{2}D^{\circ}-5d^{4}F$ $5s^{4}P-5p^{4}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3987,09 3964,89 3962,34	5 30 10	$ \begin{array}{c} 18,08 \\ 16,87 \\ 47,57 \\ 16,83 \end{array} $	21,19 20,00 20,70 19,96	5s" ² S-3° 5p ⁴ D°-5d ⁴ D 5p ⁴ S°-5d ² P° 5p ⁴ D°-5d ⁴ P	$^{1/2}_{5/2}$ $^{-3/2}_{7/2}$ $^{5/2}_{1/2}$ $^{-7/2}_{1/2}$ $^{3/2}_{7/2}$ $^{-5/2}$
3954,78 3953,59	90 20	$\left\{\begin{array}{c} 17,57\\17,37\\13,51\end{array}\right.$	20,70 $20,50$ $16,65$	$ \begin{array}{ccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 7/2 \\ 1/2 - 3/2 \end{array} $
3947,66 3945,83 3945,48 3942,93	5 1 5 20	17,57 17,25 16,87	20,71 30,39 20,01	5p 4S°-5d 4F 5p 2P°-6s" 2S 5p 4D°-5d 4P	$ \frac{3}{2} - \frac{3}{2} $ $ \frac{1}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{3}{2} $
3940,92 3938,88 3929,26 3921,68 3920,14 3917,64	5 20 20 6 200 50	18,88 16,87 18,87 18,87 16,83 18,87	22,03 20,02 22,03 22,03 20,00 22,03	$5p'\ ^2D^\circ-5d'\ ^2P$ $5p\ ^4D^\circ-5d\ ^4D$ $5p'\ ^2P^\circ-5d'\ ^2P$ $5p'\ ^2D^\circ-5d'\ ^2P$ $5p\ ^4D^\circ-5d\ ^4D$ $5p'\ ^2D^\circ-5d'\ ^2F$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
3916,90 3912,88 3912,59 3906,25 3901,15	3 5 70 150 10	17,60 17,65 13,99 18,88 16,83	20,77 20,82 17,17 22,06 20,01	$5p \ ^2D^{\circ}$ -5d 2F $5p \ ^2S^{\circ}$ -5d 2D $5s \ ^4P$ -5p $^4D^{\circ}$ $5p' \ ^2D^{\circ}$ -5d 2F $5p \ ^4P^{\circ}$ -5d 4P	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3894,71 3887,54 3885,28 3880,07 3875,44	60 5 1 2 150	16,83 18,87 16,87 18,87 17,57	20,02 22,06 20,06 22,06 20,77	$5p ^4D^{\circ} - 5d ^4D$ $5p' ^2P^{\circ} - 7s ^2P$ $5p ^4D^{\circ} - 5d ^4D$ $5p' ^2D^{\circ} - 7s ^2P$ $5p ^4S^{\circ} - 5d ^2F$	7/2 - 5/2 $1/2 - 3/2$ $5/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$
3858,78 3857,32 3846,83 3844,45 3842,28	5 20 5 50 20	18,62 17,60 16,87 18,88 16,83	21,83 20,82 20,09 22,11 20,06	$5p' ^{2}P^{\circ} - 5d' ^{2}D$ $5p ^{2}D^{\circ} - 5d ^{2}D$ $5p ^{4}D^{\circ} - 6s ^{2}P$ $5p' ^{2}D^{\circ} - 5d' ^{2}D$ $5p ^{4}P^{\circ} - 5d ^{4}D$	3/2 $3/2$ $3/2$ $3/2$ $3/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $1/2$ $3/2$
3839,37 3836,54 3831,17 3826,15 3817,11	4 30 2 2 15	17,25 17,16 16,83 18,87 17,57	20,47 20,39 20,07 22,11 20,82	$5p ^2P^{\circ}$ — $5d ^2P$ $5p ^4D^{\circ}$ — $6s'' ^2S$ $5p ^4P$ — $6s ^4P$ $5p' ^2D^{\circ}$ — $5d' ^2D$ $5p ^4S^{\circ}$ — $5d ^2D$	$ \begin{array}{c} 1/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 1/_2 - 1/_2 \\ 3/_2 - 5/_2 \\ 3/_2 - 3/_2 \end{array} $
3806,52 3806,17 3804,67	1 8 30	18,21 18,87 16,83	21,47 22,13 20,09	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7/2— $5/2$ $1/2$ — $1/2$ $1/2$ — $3/2$

λ, Å	I	$E_{\mathbf{H}}$, eV	E _B , eV	Transition	J
3783 ,13	500	16,83	20 ,11	5p ⁴ D°—5d ⁴ F	7/2—9/2
3778 ,09	500	16,87	20 ,15	5p ⁴ D°—5d ⁴ F	5/2—7/2
3771,34	30	16,65	19,94	$5p ^4P^{\circ} - 5d ^4P$	3/2— $1/2$ $1/2$ — $1/2$ $3/2$ — $1/2$ $3/2$ — $3/2$ $3/2$ — $5/2$
3765,88	2	18,87	22,17	$5p' ^2P - 5d' ^2P$	
3758,93	6	18,87	22,17	$5p' ^2D - 5d' ^2P$	
3754,24	80	14,27	17,57	$5s ^4P - 5p ^4S^{\circ}$	
3744,80	150	17,16	20,47	$5p ^4D^{\circ} - 5d ^4F$	
3741,69 3740,73 3735,78 3732,92 3732,61	$200 \\ 6 \\ 40 \\ 6 \\ 15$	18,49 16,65 17,16 13,51 16,83	21,81 19,96 20,47 16,83 20,15	$5p' ^2F^{\circ} - 5d' ^2G$ $5p ^4P^{\circ} - 5d ^4P$ $5p ^4D^{\circ} - 5d ^2P$ $4p ^6 ^2S - 5p ^4P^{\circ}$ $5p ^4P^{\circ} - 6s ^2P^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
3731,67	2	17,38	20,70	$5p ^4D^{\circ}$ — $5d ^2P$	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \\ 7/_{2} - 9/_{2} \end{array} $
3728,04	7	17,37	20,70	$5p ^2P^{\circ}$ — $5d ^2P$	
3721,35	150	17,38	20,71	$5p ^2P^{\circ}$ — 3	
3718,63	200	17,38	20,71	$5p ^4D^{\circ}$ — $5d ^4F$	
3718,02	300	18,56	21,89	$5p' ^2F^{\circ}$ — $5d' ^2G$	
3716 ,15	4	14,27	17,60	$5s ^4P - 5p ^2D^{\circ}$	3/2 $3/2$ $3/2$ $3/2$ $5/2$ $3/2$ $5/2$ $3/2$ $5/2$ $5/2$ $5/2$ $5/2$
3715 ,04	12	17,37	20,71	$5p ^2P^{\circ} - 5d ^4F$	
3712 ,48	1	17,37	20,71	$5p ^2D^{\circ} - 5d ^4F$	
3711 ,27	1	18,49	21,83	$5p' ^2F^{\circ} - 5d' ^2D$	
3690 ,65	30	16,60	19,96	$5p ^4P^{\circ} - 5d ^4P$	
3686 ,15 3680 ,37 3678 ,66	80 100 7	16,65 16,65 —	20,01 20,02 —	5p ⁴ P°—5d ⁴ P 5p ⁴ P°—5d ⁴ D —	3/ ₂ —3/ ₂ 3/ ₂ —5/ ₂
$3669,01 \\ 3668,59$	150 6	16,83	20,21	5p ⁴ P °—5d ⁴ D	1/2—1/2
3666,01 3663,44 3661,00 3653,97 3651,02	5 20 15 250 25	14,27 13,99 13,99 16,60 17,37	17,65 17,37 17,37 20,00 29,77	$5s ^4P - 5p ^2S^{\circ} \ 5s ^4P - 5p ^2D^{\circ} \ 5s ^4P - 5p ^2P^{\circ} \ 5p ^4P^{\circ} - 5d ^4D \ 5p ^2P^{\circ} - 5d ^2F$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 7/2 - 5/2 \end{array} $
3648,61	40	17,37	20,77	$5p \ ^2D^{\circ} - 5d \ ^2F$	3/2 - 5/2 $3/2 - 3/2$ $5/2 - 3/2$ $3/2 - 5/2$ $3/2 - 5/2$ $3/2 - 3/2$
3637,93	4	18,62	22,03	$5p' \ ^2P^{\circ} - 5d' \ ^2P$	
3637,48	20	16,60	20,01	$5p \ ^4P^{\circ} - 5d \ ^4P$	
3634,42	3	18,62	22,03	$5p' \ ^2P^{\circ} - 5d' \ ^2F$	
3633,54	3	16,65	20,06	$5p \ ^4P^{\circ} - 5d \ ^4D$	
3631,87	200	16,60	20,02	$5p ^4P^{\circ} - 5d ^4D$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3623,61	30	16,65	20,07	$5p ^4P^{\circ} - 6s ^4P$	
3607,88	100	17,60	21,04	$5p ^2D^{\circ} - 5d ^2D$	
3602,12	2	18,62	22,06	$5p' ^2P^{\circ} - 7s ^2P$	
3599,90	40	16,65	20,09	$5p ^4P^{\circ} - 6s ^2P$	
3599,21	25	17,37	20,82	$5p \ ^{2}P^{\circ}-5d \ ^{2}D$	3/2 - 3/2 $5/2 - 3/2$ $1/2 - 1/2$ $5/2 - 3/2$ $1/2 - 3/2$
3596,86	2	17,37	20,82	$5p \ ^{2}D^{\circ}-5d \ ^{2}D$	
3589,65	70	17,25	20,70	$5p \ ^{2}P^{\circ}-5d \ ^{2}P$	
3586,25	12	16,60	20,06	$5p \ ^{4}P^{\circ}-5d \ ^{4}D$	
3577,60	4	17,25	20,71	$5p \ ^{2}P^{\circ}-5d \ ^{4}F$	
3572,68 3569,68 3555,54 3553,49 3548,71	15 2 , 8 20 6	17,57 18,56 18,62 16,60 15,00	21,04 22,03 22,11 20,09 18,49	$5p {}^{4}S^{\circ} - 5d {}^{2}D$ $5p' {}^{2}F^{\circ} - 5d' {}^{2}F$ $5p' {}^{2}P^{\circ} - 5d' {}^{2}D$ $5p {}^{4}P^{\circ} - 6s {}^{2}P$ $4d {}^{4}D - 5p' {}^{2}F^{\circ}$	3/2 - 5/2 7/2 - 5/2 3/2 - 5/2 5/2 - 3/2 3/2 - 5/2 3/2 - 5/2
3544,54 3544,14 3535,35 3527,42 3517,37	30 30 50 3 5	18,56 17,65 16,65 — 15,10	22,06 21,15 20,15 — 18,62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	7/2 - 7/2 $1/2 - 3/2$ $3/2 - 1/2$ $ 1/2 - 3/2$
3503,25	50	18,49	22,03	$5p' {}^{2}F^{\circ} - 5d' {}^{2}F$	$\frac{5}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{1}{2}$
3498,92	2	17,16	20,70	$5p {}^{4}D^{\circ} - 5d {}^{2}P$	

			7.		
λ, Å	I	E _H , eV	E _B , eV	Transition	J
3498,50 3497,45 3493,57	4 3 2	17,60 18,62 18,56	21 ,15 22 ,17 22 ,11	$5p ^2D^{\circ} - 6s' ^2D$ $5p' ^2P^{\circ} - 5d' ^2P$ $5p' ^2F^{\circ} - 5d' ^2D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{7}{2}$ $\frac{5}{2}$
3493,04 3488,65 3487,49 3479,00	8 30 7 3	17,16 16,83 17,16 18,49 16,65	20,70 20,39 20,71 22,06 20,21	$5p ^4D^{\circ} - 3$ $5p ^4P^{\circ} - 6s'' ^2S$ $5p ^4D^{\circ} - 5d ^4F$ $5p' ^2F^{\circ} - 5d' ^2F$ $5p ^4P^{\circ} - 5d ^4D$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
3477,89	5 3	14,93	18,49	$4d^{4}D$ — $5p'^{2}F^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
3475,31 3470,05 3465,41 3460,09 3453,46	30 6 50 3	17,25 17,57 13,99	20 ,82 21 ,15 17 ,57	$5p ^{2}P^{\circ} - 5d ^{2}D$ $5p ^{4}S^{\circ} - 6s' ^{2}D$ $5s ^{4}P - 5p ^{4}S^{\circ}$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3446,51 3443,29	50 5	16,87 —	20,47	5p ⁴ D°—5d ⁴ F	⁵ / ₂ — ⁵ / ₂
3438 ,88 3431 ,03	3 8	16,87	20,47	5p 4D°—5d 2P	⁵ / ₂ — ³ / ₂
3429,91 3427,71	3 30	18,49 13,99	22,11 17,60	$5p'$ 2F ° $-5d'$ 2D $5s$ 4P $-5p$ 2D °	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
3423,73 3414,80 3412,67 3405,16	20 10 1 80	15,00 14,93 16,83 16,83	18,62 18,56 20,47 20,47	$5s {}^{2}P - 5p' {}^{2}P^{\circ}$ $4d {}^{4}D - 5p' {}^{2}F^{\circ}$ $5p {}^{4}D^{\circ} - 5d {}^{4}F$ $5p {}^{4}P^{\circ} - 5d {}^{2}P$	1/2 - 3/2 $5/2 - 7/2$ $7/2 - 5/2$ $1/2 - 3/2$
3402,79 3389,67	2 5	13,51 14,90	17,16 18,56	$^{4p^{6}}^{2}S$ $-5p^{4}D^{\circ}$ $^{4}d^{4}D$ $-5p'^{2}F^{\circ}$	$\frac{1}{7} \frac{3}{2} \frac{3}{7} \frac{3}{2}$
3387,11 3385,23 3381,11	7 15 20	17,16 17,37	20 ,82 21 ,04	$5p ^4D^{\circ} - 5d ^2D \ 5p ^2P^{\circ} - 5d ^2D$	$\frac{3}{3}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3379,03 3375,78 3357,58 3335,46 3326,13	15 3 2 4 1	17,37 16,83 14,93 17,60 17,60	21,04 20,50 18,62 21,32 21,33	$5p ^2D^{\circ} - 5d ^2D$ $5p ^4D^{\circ} - 5d ^2F$ $4d ^4D - 5p' ^2P^{\circ}$ $5p ^2D^{\circ} - 4d'' ^2D$ $5p ^2D^{\circ} - 4d'' ^2D$	$\begin{array}{c} 5/2 - 5/2 \\ 7/2 - 7/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
3321,16 3315,72	8 15 4	13,51 16,65	17,25 20,39	$4p^{6} {}^{2}S - 5p {}^{2}P^{\circ} 5p {}^{4}P^{\circ} - 6s'' {}^{2}S$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
3302 ,28 3301 ,75 3300 ,18	5 4	18,87 18,87	$\begin{array}{c} -22,62\\ 22,62\end{array}$	$4d'\ ^{2}P-8^{\circ}\ 4d'\ ^{2}P-9^{\circ}$	$\frac{1}{1/2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
3295,29 3287,69 3287,38 3282,08 3264,33	3 2 2 15 5	17,38 15,10 15,10 18,87	21 ,15 18 ,87 18 ,87 22 ,66	$-5p ^4D^{\circ} - 6s' ^2D$ $4d ^4D - 5p' ^2D^{\circ}$ $4d ^4D - 5p' ^2P^{\circ}$ $4d' ^2P - 10^{\circ}$	-1/2 - 3/2 $1/2 - 3/2$ $1/2 - 1/2$ $1/2 - 1/2$ $1/2 - 3/2$
3263,12 3261,58 3256,67 3248,03 3247,00	1 8 4 6 12	18,82 18,82 14,69 18,87 16,65	22,62 22,62 18,49 22,68 20,47	$4d' {}^{2}P - 8^{\circ}$ $4d' {}^{2}P - 9^{\circ}$ $5s {}^{2}P - 5p' {}^{2}F^{\circ}$ $4d' {}^{2}P - 12^{\circ}$ $5d {}^{4}P^{\circ} - 5d {}^{4}F$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
3240,20 3232,45 3226,57 3223,52 3223,00	2 2 5 12 6	16,65 16,87 18,82 18,82 17,00	20,47 20,70 22,66 22,67 20,84	$5d ^4P^{\circ} - 5d ^2P$ $5p ^4D^{\circ} - 3$ $4d' ^2P - 10^{\circ}$ $4d' ^2P - 11^{\circ}$ $4d ^2F - 5f ^4F^{\circ}$	3/2 - 3/2 $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$ $3/2 - 5/2$ $5/2 - 7/2$
3220,25 3216,25 3210,89 3210,64 3209,7	6 7 7 2 7	17,00 13,51 18,82 16,60	20,85 17,37 22,68 20,47	$^-4d^{\ 2}F - 5f^{\ 4}F^{\circ} \ ^4p^{6\ 2}S - 5p^{\ 2}P^{\circ} \ ^4d'^{\ 2}P - 12^{\circ} \ 5p^{\ 4}P^{\circ} - 5d^{\ 4}F$	$ \begin{array}{c}$
11114					

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3208,28	40	$\left\{\begin{array}{c} 13,51\\17,00 \end{array}\right.$	17,38 20,86	$4p^{6} {}^{2}S - 5p {}^{4}D^{\circ}$ $4d {}^{2}F - 5f {}^{2}F^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3207,29	1	16,83	20,70	$5p {}^{4}P^{\circ} - 5d {}^{2}P$	$^{1}/_{2}$ _1/ ₂
$3205,44 \\ 3205,26$	$\frac{2}{4}$	15,00 15,00	18,87 18,87	$\frac{5}{4}s^{2}P - 5p'(^{2}D^{\circ}) + 4d^{4}D - 5p'(^{2}D^{\circ})$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3202,54	$1\overline{5}$	16,60	20,47	$5p^4P^{\circ}-5d^2P$	$\frac{5}{2} - \frac{3}{2}$
3200,40	50	15,00	18,87	$5s {}^{2}P^{\circ} - 5p' {}^{2}P^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$
3197,65 3195,50	$\frac{4}{2}$	16,83 17,00	$20,71 \\ 20,88$	$5p\ ^4P^{\circ}$ — $5d\ ^4F$ $4d\ ^2F$ — $5f\ ^4F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
3192,54	2	60, 17	21,49	$5p\ ^{2}D^{\circ}-7s\ ^{4}P$	3/2 $5/2$
3187,61	4	15,00 17,00	18,88 20,89	$^{4}d~^{4}D-5p'~^{2}D^{\circ} \ ^{4}d~^{2}F-5f~^{2}F^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3181,25	5	17,00	20,00	4 <i>u r — 5_j r</i>	72 72 —
3178,92	1	16,87	20,77	$5p {}^{4}D^{\circ} - 5d {}^{2}F$	$\frac{5}{2} - \frac{5}{2}$
3176 ,94 3175 ,67	15 40	$\frac{17,25}{48,82}$	$\frac{21}{22}, \frac{15}{73}$	$\frac{5p}{4}P^{\circ}-6s'^{2}D$ $\frac{4d'}{2}F-13^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3170,67	$\frac{40}{2}$	18,82 17,00	$22,73 \\ 20,91$	$4d^{2}F - 15$ $4d^{2}F - 5f^{2}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$
2464 04	3	16,68	20,60	4d ² D—1°	5/2-3/2
3164,94		l 17,57	21,49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3150 ,93 3147 ,39	80 1	$14,69 \\ 14,93$	18,62 18,87	$4d ^4D - 5p' ^2D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3140,44	3	17,37	21,32	$5p^{2}P^{\circ}$ — $4d''^{2}D$	
3139,86	4	17,00	20,94	$4d^{2}F$ — $5p''^{2}P^{\circ}$	5/ ₂ —3/ ₂
3139,58	20	16,87 17,38	20,82 $21,33$	$5p$ 4D °— $5d$ 2D $5p$ 4D °— $4d''$ 2D	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2135,10	8	$\begin{cases} 17,36\\ 14,93 \end{cases}$	18,88	$4d^{4}D$ — $5p'^{2}D^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
$3132,84 \\ 3126,02$	$\frac{4}{6}$	_	_	<u> </u>	_
3113,92	$\overset{\circ}{2}$	14,90	18,88	$4d ^4D - 5p' ^2D^{\circ}$	$^{7}/_{2}$ — $^{5}/_{2}$
3111,45	2	16,83	20,82	$5p ^4P^{\circ} - 5d ^2D$	$\frac{1}{2}$ $\frac{3}{2}$
3105,68	1	17,16	$21,15 \\ 22,62$	$5p ^4D^{\circ} - 6s' ^2D$ $4d' ^2D - 8^{\circ}$	$\frac{3}{2}$ $\frac{-3}{2}$ $\frac{3}{2}$
$3096,52 \\ 3095,14$	$\frac{20}{30}$	18,62 18,62	$\frac{22,02}{22,62}$	$4d' {}^{2}D - 9^{\circ}$	3/2 - 3/2 $3/2 - 3/2$ $3/2 - 1/2$
3066,72	2	14,58	18,62	$5s ^4P - 5p' ^2P^{\circ}$	$^{1}/_{2}$ — $^{3}/_{2}$
3063,57	3	18,62	22,66	4d' ² D-10°	3/2-3/2
3061 ,51 3060 ,84	$\begin{array}{c} 6 \\ 30 \end{array}$	$\frac{-}{16,65}$	20,70	4d' 2D—11°	3/ ₂ —5/ ₂
3056,01	30	16,65	20,70	$^{5p}_{4p^{6}}^{4P^{\circ}}\!\!-\!\!3}_{4p^{6}}^{2S}\!\!-\!\!5p}^{4}S^{\circ}$	$\frac{3}{2}$ _5 $\frac{5}{2}$ $\frac{1}{2}$ _3 $\frac{3}{2}$
3055,31	3	13,51	17,57	•	
3051 ,75 3049 ,23	1 8	16,65 18,62	$20,71 \\ 22,68$	$5p {}^{4}P^{\circ} - 5d {}^{4}F \ 4d' {}^{2}D - 12^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3038,38	$\ddot{3}$	_			_
3034,16	2	$\left\{ \begin{array}{l} 18,54 \\ 17,25 \end{array} \right.$	22,62 21,33	$\frac{4d'}{5p}\frac{^{2}D}{^{2}P}^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
3032,77	5	_	_		· · · · · · · · · · · · · · · · · · ·
3031,59	5	_	_	_	-
3030,01	4	13,51	17,60	$^{4p^{6}}_{5p}^{2}S-^{5p}_{}^{2}D^{\circ}_{-3}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
$3022,49 \\ 3018,30$	5 1	16,60 16,60	$20,70 \\ 20,71$	$5p$ 4P -3 $5p$ 4P ° $-5d$ 4F	5/2 - 3/2
3017,65	20	18,62	22,73	$4d'^{2}D-13^{\circ}$	$3/2^{-}$ $5/2^{-}$
3012,00	1	17,37	21,49	$5p^{2}D^{\circ}-7s^{4}P$	$\frac{5}{2}$ $\frac{5}{2}$
3008,42	$rac{8}{2}$	16,65 18,54	$20,77 \\ 22,66$	$\frac{5p}{4}P^{\circ}-5d^{2}F$ $4d'^{2}D-10^{\circ}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}$
3002,48 2999,84	$4\overset{2}{0}$	18,54	22,67	4d′ ² D—11°	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \end{array}$
2996,60	20	13,51	17,65	$4p^{6} {}^{2}S - 5p {}^{2}S^{\circ}$	
2988,69	3	18,54	22,68	4d' ² D—12°	5/2-3/2
$2985,33 \\ 2983,94$	$\frac{4}{2}$	17,37	$\frac{-}{21,53}$	$\frac{-}{5p^{\ 2}P^{\circ}-7s^{\ 4}P}$	3/2-3/2
4509,54	4	, , , , , ,	21 ,00	or	.5 .2

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λ, Å	I	E _H , eV	E _B . eV	Transition	J
2982 ,34 2979 ,81	1 20	$17,37 \\ 16,68$	$21,53 \\ 20,84$	5p ² D°—7s ⁴ P 4d ² D—5f ⁴ F°	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2978,87 2976,28	$\frac{25}{3}$	16,69 17,16	20,85 $21,32$	$4d^{2}P$ — $5f^{4}F^{\circ}$ $5p^{4}D^{\circ}$ — $4d''^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2975,92	3	16,6 0	20,77	$5p\ ^4P^{\circ}$ — $5d\ ^2F$	$^{5}/_{2}$ — $^{5}/_{2}$
$2974,04 \\ 2972,34$	$\frac{25}{2}$	46,68 16,87	$20,85 \ 21,04$	$^4d\ ^2D - 5f\ ^4F^\circ \ 5p\ ^4D^\circ - 5d\ ^2D$	$\frac{5}{2} - \frac{5}{2}$ $\frac{5}{2} - \frac{5}{2}$
2971,80 2967,25	4 80	16,69 16,68	$20,\!86$ $20,\!86$	$\frac{4d}{4}P - 5p''^{2}P^{\circ}$ $\frac{4d}{2}D - 5f^{2}F^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2966 ,43 2965 ,44 2961 ,05	3 2 4	14,69 16,69	18,87 20,88	5s ² P—5p′ ² D° 4d ² P—5f ⁴ F°	$\frac{-}{3}_{2}$ $\frac{-}{3}_{2}$ $\frac{3}{2}$
2960,78	20	14,69	18,87	$5s$ 2P — $5p'$ $^2P^\circ$	$^{3}/_{2}$ — $^{1}/_{2}$
2960,14 2958,35	40 20	18,54	22,73	4d' ² D—13°	$\frac{-5}{5/2}$
2956,30 2954,28	$\frac{3}{12}$	16,68 14,69	20,88 18,88	$4d ^{2}D - 5f ^{4}F^{\circ} \ 5s ^{2}P - 5p' ^{2}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2950,21	30	16,69	20,89	$4d^{2}P$ — $5\hat{f}^{2}F^{\circ}$	$3/2_{2}^{5}$
2949,54	15	16,68	20,89	$-4d^{2}D - 5f^{2}F^{c}$	$\frac{-}{5/2}$
$2939,70 \\ 2932,06$	$\frac{2}{1}$	16,69 16,69	$20,91 \\ 20,92$	$\frac{4d\ ^{2}P-5f\ ^{2}D^{\circ}}{4d\ ^{2}P-5f\ ^{4}D^{\circ}}$	$\frac{3}{2}$
2930,40	2	17,60	21 ,83	$5p^2D^{\circ}-5d'^2D$	3/2-3/2
2921,92 2913,23	4	16,69	20,94	$4d^{2}P - 5p''^{2}P^{\circ}$	$\frac{-}{3/2}$
$2908,63 \\ 2907,15$	5 1	46,68 17,57	20,94 21,83	$\frac{4d}{5p}$ $\frac{^{2}D}{5p}$ $\frac{^{2}P}{5p}$ $\frac{^{4}S}{5}$ $^$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2895,92	1	16,32	20,60	$4d^{2}F$ —1°	⁷ / ₂ — ³ / ₂
2894,63 2884,21	2 2	17,25 17,17	21,53 21,47	$\frac{5p}{2}P^{\circ}$ —7s ^{4}P 2—5f' $^{2}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2873,72 2862,17	$\frac{4}{2}$	16,83 17,16	21 ,15 21 ,49	5p ⁴ P°—6s′ ² D 5p ⁴ D°—7s ⁴ P	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2847,36	25	14,27	18,62	$5s ^4P - 5p' ^2P^{\circ}$	3/2 - 3/2
2844,46 2839,20	$\frac{20}{2}$	16,48 16,48	$20,84 \\ 20,85$	$\begin{array}{c} 1 - 5f {}^4F^{\circ} \\ 1 - 5f {}^4F^{\circ} \end{array}$	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
2838,79 2835,35	20 8	16,48	20,85 21,53	$4d\ ^{2}D-5f\ ^{4}F^{\circ} \ 5p\ ^{4}D^{\circ}-7s\ ^{4}P$	$^{3}/_{2}$ — $^{5}/_{2}$
2833,00	100	$17,16 \\ 16,48$	20,86	$\begin{array}{c} 5p \cdot D - 7s \cdot P \\ 1 - 5f \cdot 2F^{\circ} \end{array}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2832,39 2830,43	$\frac{2}{3}$	16,48 17,65	20,86	$4d^{2}D - 5p''^{2}P^{\circ}$	$\frac{3}{2}$ $\frac{1}{2}$
2823,03	$\frac{3}{2}$	16,48	22,03 20,88	$5p {}^{2}S^{\circ} - 5d' {}^{2}P$ $1 - 5f {}^{4}F^{\circ}$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
2822,63	5	{ 16,65 16,48	21,04 20,88	5p ⁴ P°—5d ² D 4d ² D—5f ⁴ F°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2816,87	30	10,40	20,89	$1-5f^2F^\circ$	$^{5}/_{2}$ — $^{5}/_{2}$
2816,46 2808,72	60 1	$16,48 \\ 17,65$	$20,89 \ 22,06$	$\frac{4d}{5p}\frac{^{2}D}{^{2}S^{\circ}}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2803,60 2803,20	$\frac{4}{20}$	16,48 16,48	$20,91 \\ 20,91$	$\frac{1-5f^{2}D^{\circ}}{4d^{2}D-5f^{2}D^{\circ}}$	$^{5}/_{2}$ $^{-3}/_{2}$
2801,23	20	17,60	$\frac{20,31}{22,03}$	$5p^{-2}D^{\circ} - 5d'^{-2}P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2800,98 2796,26	$\frac{2}{2}$	17,65	22,07	$5p^{2}S^{\circ} - 7s^{4}P$	$\frac{1}{2}/2 - \frac{1}{2}/2$
2795,81	30	16,48 —	20,92 —	4d ² D—5f ⁴ D° —	³ / ₂ — ³ / ₂
2789,83 2779,97	3 1	17,60	22,06	$5p {}^{2}D^{\circ} - 7s {}^{2}P$	3/ ₂ _3/ ₂
		17,57	22,03	$5p$ $^4S^\circ$ — $5d'$ 2P	$^{3}/_{2}$ — $^{3}/_{2}$
2779 ,51 2779 ,11	4 20	16,48 16,48	$20,94 \\ 20,94$	$\frac{1-5p''^2P^{\circ}}{4d^2D-5p''^2P^{\circ}}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2778 ,99 554	2	17,37	21,83	$5p ^2P^{\circ} - 5d' ^2D$	3/2 - 3/2
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λ, Å	λ	$E_{ m H}$, eV	E _B , eV	Transition	J
2777,96 2774,59	1 3	17,57 17,00	22,03 21,46	5p 4S°—5d′ 2F 4d 2F—5f′ 2F°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2772,60 2759,02 2751,59 2747,41 2746,31	10 4 5 2 15	17,00 17,57 17,57 —	21,47 22,06 22,07	4d ² F—5f′ ² F° 5p ⁴ S°—7s ² P 5p ⁴ S°—7s ⁴ P —	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ \end{array} $
2744,64 2742,56 2740,11 2738,13 2733,26	1 40 1 1 50	17,65 16,32 16,32 17,60	22,17 20,84 20,84 22,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{1/2}_{7/2}$ $^{1/2}_{7/2}$ $^{1/2}_{9/2}$ $^{1/2}_{7/2}$ $^{1/2}_{1/2}$ $^{1/2}_{-}$
2732,33 2729,46 2719,90 2717,70	4 30 5 1	17,00 16,32 — 17,57	21,53 20,86 — 22,13	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} ^{5}/_{2} - ^{3}/_{2} \\ ^{7}/_{2} - ^{7}/_{2} \\ $
2717,18 2716,16 2714,49 2712,40 2711,11 2710,27	1 10 3 80 2 3	17,60 16,29 16,32 16,32 13,99 16,29	22,17 20,85 20,89 20,89 18,56 20,86	$5p^{2}D^{\circ}-5d'^{2}P$ $4d^{4}P-5f^{2}F^{\circ}$ $4d^{2}F-5f^{2}F^{\circ}$ $4d^{2}F-2^{\circ}$ $5s^{4}P-5p'^{2}F^{\circ}$ $4d^{4}P-5p''^{2}P^{\circ}$	3/2— $1/2$ $5/2$ — $5/2$ $7/2$ — $5/2$ $7/2$ — $7/2$ $5/2$ — $7/2$ $5/2$ — $7/2$ $5/2$ — $1/2$
2701,34	15	$ \left\{ \begin{array}{c} 16,29 \\ 17,25 \end{array} \right. $	20,89 21,83	$4d\ ^4P - 5f\ ^4F^\circ \ 5p\ ^2P^\circ - 5d'\ ^2D$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2700,60 2695,70 2691,20 2688,37	$\begin{matrix}3\\30\\2\\4\end{matrix}$	16,29 14,27	20 ,89 18 ,87	4d ⁴ P—5f ² F° 5s ⁴ P—5p′ ² P°	5/2—5/2 3/2—1/2 —
2683,55 2677,20 2675,31 2672,79 2666,61	15 6 4 3 6	16,29 16,29 16,23 17,00 16,23	20,91 20,92 20,86 21,63 20,88	$4d\ ^4P-5f\ ^2D^\circ \ 4d\ ^4P-5f\ ^4D^\circ \ 4d\ ^4P-5p''\ ^2P^\circ \ 4d\ ^2F-5f'\ ^2P^\circ \ 4d\ ^4P-5f\ ^4F^\circ \ $	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
2664,37 2664,00 2662,57 2661,47 2661,22	4 8 2 5 1	17,38 16,83 17,37 16,29 { 17,37 16,23	22,03 21,49 22,03 20,94 22,03 20,89	$5p ^4D^{\circ} - 5d' ^2P$ $5p ^4P^{\circ} - 7s ^4P$ $5p ^2P^{\circ} - 5d' ^2P$ $4d ^4P - 5p'' ^2P^{\circ}$ $5p ^2D^{\circ} - 5d' ^2P$ $4d ^4P - 5f ^2F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
2660,97 2659,60 2656,38 2653,95 2649,67	8 2 15 6 4	16,87 17,38 — 16,18 17,16	21,53 22,03 20,85 21,83	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 5/2 - 3/2 \\ 5/2 - 5/2 \\ - \\ 1/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2649,27 2648,15 2643,06 2642,08 2640,74	20 20 20 4 2	16,23 16,23 17,37 16,83	20,91 20,92 22,06 21,53	$4d\ ^4P$ — $5f\ ^2D^\circ$ — $4d\ ^4P$ — $5f\ ^4D^\circ$ $5p\ ^2D^\circ$ — $7s\ ^2P$ $5p\ ^4P^\circ$ — $7s\ ^4P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2638,32 2636,51 2634,41 2627,75 2627,22	2 3 6 7 3	17,38 17,37 16,18 16,23 16,60	22,07 22,07 20,89 20,94 21,32	$5p ^4D^{\circ} - 7s ^4P$ $5p ^2P^{\circ} - 7s ^4P$ $4d ^4P - 5f ^2F^{\circ}$ $4d ^4P - 5p'' ^2P^{\circ}$ $5p ^4P^{\circ} - 4d'' ^2D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
2624,78 2622,82 2620,65	6 2 6	16,18	20,91	4d ⁴ P—5f ² D°	1/ ₂ —3/ ₂ —

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2620,44	40	16,69	21,42	4d ² P-5f′ ² D°	³ / ₂ — ⁵ / ₂
2616,71	10	$\left\{\begin{array}{c} 16,18\\16,68 \end{array}\right.$	20,92 21,42	4d ⁴ P-5f ⁴ D° 4d ² D-5f′ ² D°	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
$2610,98 \ 2610,76$	10 1	 15,85	20,60	5s' ² D—1°	
2605,41	1	17,37	22,13	$5p^{2}P^{\circ}$ — $7s^{2}P^{\circ}$	$^{3}/_{2}$ — $^{1}/_{2}$
2602,11 2597,73	7 7	$16,08 \\ 16,08$	$20,84 \\ 20,85$	4d 4F—5f 4F° 4d 4F—5f 2F°	$\frac{5}{2} \frac{-7}{2}$ $\frac{5}{2} \frac{-5}{2}$
2596 ,73 2595 ,36	5 4		20,86		$\frac{-}{^{3/2}-^{1/2}}$
2594,4 0	4	16,69	21,47	4d ² P—5f' ² F°	$3/_{2}$ — $5/_{2}$
$2592,48 \\ 2591,25$	$\frac{60}{1}$	$16,08 \\ 17,25$	$20,86 \ 22,03$	$4d {}^{4}F - 5f {}^{2}F^{\circ} \ 5p {}^{2}P^{\circ} - 5d' {}^{2}P$	$\frac{5}{2}$ $\frac{-7}{2}$ $\frac{1}{2}$ $\frac{-3}{2}$
2590,74 2589,08	2 30	16,68	21 ,47	4d ² D-5f' ² F°	⁵ / ₂ — ⁵ / ₂
2584,15	3	16,08	20,88	4d 4F—5f 4F°	⁵ / ₂ — ³ / ₂
2581 ,74 2578 ,98	5 2	16,08	20,89		$\frac{-}{5/2}$
2572 ,03 2566 ,61	1 0	$\frac{-}{17,25}$	22,07	$\frac{-}{5p^{2}P^{\circ}-7s^{4}P^{\circ}}$	$\frac{-}{^{1}/_{2}-^{1}/_{2}}$
2562,04	1	16,08	20,92	4d 4F-5f 4D°	$^{5}/_{2}^{-}$ $^{3}/_{2}^{-}$
2561,94 2559,10	3 8	$16,65 \\ 16,69$	21,49 21,53	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2556,36	6	_	_	_	_
2555 ,91 2538 ,34	$\frac{6}{5}$	16,60	$\frac{-}{21,49}$	$\frac{-}{5p} ^4P^{\circ} - 7s ^4P$	- ⁵ / ₂ ⁵ / ₂
$2531,73 \ 2527,16$	$\frac{1}{3}$	13,99 —	18,88 —	$5s ^4P - 5p' ^2D^{\circ}$	⁵ / ₂ — ⁵ / ₂
2517,95	8	_		_	_ _
$2511,74 \\ 2510,56$	3 5	16,48 16,87	21,42 21,81	$\frac{1-5f'}{5p} \frac{^2D^{\circ}}{^4D^{\circ}-5d'} \frac{^2D^{\circ}}{^2G}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2506,56	5 7	-		<u> </u>	_
2503 ,87 2494 ,66	1	16,32 17,37	21 ,27 21 ,83	4d ² F—6° 5p ⁴ D°—5d′ ² D	$^{7/}2^{7/}2$ $^{5/}2^{3/}2$
2489,39	8	16,48	21,46	1—5f′ ² F°	5/2—7/2 5/2—7/2 7/2—7/2
$2487,62 \\ 2487,50$	4 3	$15,86 \\ 16,48$	20,84 21,47	4d ⁴ F-5f ⁴ F° 4d ² D-5f' ² F°	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2483,62	1	15,86	20,85	$4d {}^{4}F - 5f {}^{4}F^{\circ}$	$^{7}/_{2}$ — $^{5}/_{2}$
$2478,85 \ 2474,69$	$\frac{3}{2}$	15,86 15,85	$20,86 \\ 20,86$	$4d\ ^4F$ — $5f\ ^2F^\circ$ $5s'\ ^2D$ — $5f\ ^2F^\circ$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{7}{2}$
2470 ,45 2464 ,77	10 100	$\frac{-}{15,86}$	20,89		7/2-7/2
2463,27	2	15,82	20,85	$5s'$ 2D — $5f$ 4F $^\circ$	$\frac{3}{2}$ $\frac{5}{2}$
$2462,33 \\ 2456,07$	$\frac{2}{6}$	15,85 —	20,89 —	5s' ² D-5f ² F° -	⁵ / ₂ — ⁵ / ₂
2455,31 $2455,04$	$rac{2}{2}$	16,48 16,48	21,53 21,53	$\frac{1-5f'\ ^{2}P^{\circ}}{4d\ ^{2}D-5f'\ ^{2}P^{\circ}}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2446,44	8	15,82	20,89	$5s' {}^{2}D - 5f {}^{2}F^{\circ}$	3/2 - 5/2
$2432,74 \\ 2428,35$	$\frac{8}{20}$	_	_	-	_
$2426,36 \\ 2418,41$	10 4	13,51 —	18,62	4p ⁶ ² S—5p′ ² P°	$^{1}/_{2}$ — $^{3}/_{2}$
2414,94	2	16,29	21,42	4d ⁴ P —5f' ² D°	
2414,89 2413,81	10 10	<u>-</u>	_	_	_
2409,06	5	16,32	21,46	4d ² F—5f′ ² F°	~/ ₂ — ⁷ / ₂
2408,52 2392,78	5 10	$\frac{-}{16,29}$	$\frac{-}{21,47}$	4d ⁴ P—5f′ ² F°	5/ ₂ —5/ ₂
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λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
2390 ,50 2375 ,52 2373 ,68 2368 ,94 2365 ,52	4 20 4 3 3	16,23 15,62 15,62 16,18 16,23	21,41 20,84 20,84 21,41 21,47	$4d\ ^4P - 5f'\ ^2D^\circ$ $4d\ ^4F - 5f\ ^4F^\circ$ $4d\ ^4F - 5f\ ^4F^\circ$ $4d\ ^4P - 5f'\ ^2D^\circ$ $4d\ ^4P - 5f'\ ^2F^\circ$	3/2 - 3/2 $9/2 - 9/2$ $9/2 - 7/2$ $1/2 - 3/2$ $3/2 - 5/2$
2362,74 2353,68 2352,86 2344,38 2316,32	$ \begin{array}{c} 6 \\ 50 \\ 2 \\ 10 \\ 10 \end{array} $	16,29 15,62 16,18	21,53 20,89 21,47 	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2315,52 2314,24 2312,00 2302,67 2301,73	8 6 6 3 6	16,18 13,51 16,09 16,08	21,53 	$4d\ ^4P-5f'\ ^2P^\circ \ -4p^6\ ^2S-5p'\ ^2P^\circ \ 4d\ ^4F-5f'\ ^2F^\circ \ 4d\ ^4F-5f'\ ^2F^\circ$	$^{1/2}_{2}$ $^{3/2}_{2}$ $^{1/2}_{3/2}$ $^{5/2}_{2}$
2300,38 2287,79 2283,07 2273,24 2272,55	$\begin{array}{c} 6 \\ 30 \\ 30 \\ 8 \\ 1 \end{array}$	16,08 15,85 — — 16,08	21 ,47 21 ,27 — — 21 ,53	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} $
2250,32 2245,39 2237,45 2227,92 2212,96	8 10 4 30 5	- - 15,85 15,82		$5s' ^{2}D - 7^{\circ}$ $5s' ^{2}D - 5f' ^{2}D^{\circ}$	$ \begin{array}{c} -\\ -\\ -\\ 5/2-5/2\\ 3/2-5/2 \end{array} $
2212,29 2214,71 2208,41 2185,52 2177,79	6 5 1 5 3	15,86 15,85 —	21,46 21,46 —	4d ⁴ F-5f' ² F° 5s' ² D-5f' ² F° -	
2164,38 2162,50 2145,08 2133,85 2129,80	4 3 10 2 1	 15,10 15,10 15,10	20 ,88 20 ,91 20 ,92	$ 4d\ ^4D-5f\ ^4F^\circ$ $4d\ ^4D-5f\ ^2D^\circ$ $4d\ ^4D-5f\ ^4D^\circ$	$\begin{array}{c} - \\ - \\ 1/_2 - 3/_2 \\ 1/_2 - 3/_2 \\ 1/_2 - 3/_2 \end{array}$
2123,48 2118,83 2109,81 2098,97 2096,24	3 12 5 1 15	15,00 15,00 15,00 14,93	20,85 20,88 20,91 20,84	$-4d$ 4D $-5f$ 4F ° 4d 4D $-5f$ 4F ° 4d 4D $-5f$ 2D ° 4d 4D $-5f$ 4F °	$ \begin{array}{c}$
2095,02 2093,37 2088,16 2086,73 2084,54	1 3 20 5 1	15,00 14,93 14,90 14,90 14,93	20,92 20,85 20,84 20,84 20,88	$4d\ ^4D-5f\ ^4D^\circ \ 4d\ ^4D-5f\ ^4F^\circ \ 4d\ ^4D-5f\ $	3/2 - 1/2 $5/2 - 5/2$ $7/2 - 9/2$ $7/2 - 7/2$ $5/2 - 3/2$
2083,87 2080,53 964,962 917,434 911,384	1 1 30 20 25	14,90 14,90 0,67 0,00 0,67	20,85 20,84 13,51 13,51 14,27	$4d\ ^4D - 5f\ ^4F^\circ$ $4d\ ^4D - 5f\ ^2F^\circ$ $4p^5\ ^2P^\circ - 4p^6\ ^2S$ $4p^5\ ^2P^\circ - 4p^6\ ^2S$ $4p^5\ ^2P^\circ - 5s\ ^4P$	7/2 - 5/2 $7/2 - 7/2$ $1/2 - 1/2$ $3/2 - 1/2$ $1/2 - 3/2$
890,982 886,302 884,144 868,869 864,812	20 30 30 25 20	0,67 0,00 0,67 0,00	14,58 13,99 14,69 14,69 15,00	$4p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 5s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{4}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
859,040 850,318	20 6	0,67 0,00	15,10 14,58	$4p^{5-2}P^{\circ}-4d^{4}D$ $4p^{5-2}P^{\circ}-4d^{4}D$ $4p^{5-2}P^{\circ}-5s^{4}P$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

λ. Å	I	E _H , eV	E _B , eV	Transition	J
844,058 830,377 826,432	25 18 22	0,00 0,00 0,00	14,69 14,93 15,00	$4p^{5} {}^{2}P^{\circ} - 5s {}^{2}P 4p^{5} {}^{2}P^{\circ} - 4d {}^{4}D (4p^{5} {}^{2}P^{\circ} - 5s {}^{2}P$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
821,161 818,147	20 25	0,00	15,10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
799 ,083 796 ,678	$\frac{9}{6}$	$0,67 \\ 0,67 \\ 0,67 \\ 0,00$	15,82 16,18 16,23 15,82	$4p^{5} {}^{2}P^{\circ} - 4d^{4}P$ $4p^{5} {}^{2}P^{\circ} - 4d^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$	$^{1/_{2}-3/_{2}}$ $^{1/_{2}-1/_{2}}$ $^{1/_{2}-3/_{2}}$ $^{3/_{2}-3/_{2}}$
783,715 782,084	20 25	$\begin{cases} 0,67\\ 0,67\\ 0,00 \end{cases}$	16,48 16,48	$4p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5s' {}^{2}D$	$\frac{\frac{1}{2} - \frac{1}{2}}{\frac{1}{2} - \frac{3}{2}}$ $\frac{3}{2} - \frac{5}{2}$
773,684 771,024 766,202 763,976	18 18 9 11	0,67 0,00 0,00 0,00	16,69 16,08 16,18 16,23	$4p^{5} {}^{2}P^{\circ} - 4d {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{4}F$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{4}P$	$ \begin{array}{c} $
761,050 752,051 743,122 742,821 729,402	18 30 9 9	00,00 00,00 00,00 00,00 00,00	16,29 16,48 16,68 16,69 17,00	$4p^{5} {}^{2}P^{\circ} - 4d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 4d {}^{2}F$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $
722,036 712,036 690,557 685,812 682,791	50 8 11 11 16	0,00 0,67 0,67 0,00 0,67	17,17 18,08 18,62 18,08 18,82	$4p^{5} {}^{2}P^{\circ} - 2$ $4p^{5} {}^{2}P^{\circ} - 5s'' {}^{2}S$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5s'' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
681,119 668,827 665,870 663,039 658,637	16 20 9 20 5	0,67 0,00 0,00 0,00 0,00	18,87 18,54 18,62 18,70 18,82	$4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}F$ $4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
657,088 655,677 643,404 640,870 639,263	13 5 9 5 5	0,00 0,67 0,67 0,67 0,67	18,87 19,57 19,94 20,01 20,06	$4p^{5} {}^{2}P^{\circ} - 4d' {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
638,952 638,214 636,154 634,265 633,375	5 4 3 4 5	0,67 0,67 0,67 0,67 0,00	20,07 20,09 20,15 20,21 19,57	$4p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$	$\begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
621,910 621,071 619,548 619,379 618,879	5 5 2 2 3	0,00 0,00 0,00 0,00 0,00 0,67	19,94 19,96 20,01 20,02 20,70	$4p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}P$	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \end{array} $
618,515 618,042 617,750 617,068 615,225	2 4 4 6 4	0,67 0,00 0,00 0,00 0,00 0,67	20,71 20,06 20,07 20,09 20,82	$4p^{5} {}^{2}P^{\circ} - 5d {}^{4}F$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 6s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 1/_{2} - 3/_{2} \end{array}$
615,134 613,336 608,124 605,776 605,536	4 4 5 5 5	0,00 0,00 0,00 0,00 0,00	20,45 20,21 20,39 20,47 20,47	$4p^{5} {}^{2}P^{\circ} - 6s {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$ $4p^{5} {}^{2}P^{\circ} - 6s'' {}^{2}S$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{4}F$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}P$	3/2 $3/2$ $1/2$ $3/2$ $1/2$ $3/2$ $1/2$ $3/2$ $1/2$ $3/2$ $3/2$ $3/2$ $3/2$
605,316 599,944 598,968	5 4 3	0,67 0,67 0,00	21,45 21,33 20,70	$4p^{5} {}^{2}P^{\circ} - 6s' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 4d'' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}P$	$^{1}/_{2}$ $^{-3}/_{2}$ $^{1}/_{2}$ $^{-3}/_{2}$ $^{3}/_{2}$ $^{-1}/_{2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
598,791 598,66	3	0,00 0,00	20,70 20,71	$^{4p^5}^{2}P^{\circ}\!\!\!\!-\!\!\!\!\!-\!$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
596 ,944 595 ,530 589 ,262 586 ,269 585 ,684	4 7 5 1 2	0,00 0,00 0,00 0,00 0,00 0,67	20,77 20,82 21,04 21,15 21,83	$4p^{5} {}^{2}P^{\circ} - 5d {}^{2}F$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5d {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 6s' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5d' {}^{2}D$	$\begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array}$
581,496 581,22 580,342 579,11 577,01	3 1 3 0 0	0,00 0,00 0,67 0,67 0,00	21,32 21,33 22,03 22,07 21,49	$4p^{5} {}^{2}P^{\circ}$ — $4d'' {}^{2}D$ $4p^{5} {}^{2}P^{\circ}$ — $4d'' {}^{2}D$ $4p^{5} {}^{2}P^{\circ}$ — $5d' {}^{2}P$ $4p^{5} {}^{2}P^{\circ}$ — $7s {}^{4}P$ $4p^{5} {}^{2}P^{\circ}$ — $7s {}^{4}P$	$\begin{array}{c} {}^{3}/_{2}-{}^{5}/_{2} \\ {}^{3}/_{2}-{}^{3}/_{2} \\ {}^{1}/_{2}-{}^{3}/_{2} \\ {}^{1}/_{2}-{}^{1}/_{2} \\ {}^{3}/_{2}-{}^{5}/_{2} \end{array}$
576,647 575,902 560,788 559,320	4 2 3 4	0,67 0,00 0,00 0,00	22,17 21,53 22,11 22,17	$4p^{5} {}^{2}P^{\circ} - 5d' {}^{2}P$ $4p^{5} {}^{2}P^{\circ} - 7s {}^{4}P$ $4p^{5} {}^{2}P^{\circ} - 5d' {}^{2}D$ $4p^{5} {}^{2}P^{\circ} - 5d' {}^{2}D$	$ \begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $

Kr III, ground state $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^{1_0}\,4s^2\,4p^{4-3}P_2$ Ionization potential $298\,020$ cm $^{-1}$; 36,947 eV

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λ, λ	I	$E_{\rm H}$, eV	E _B . eV	Transition	J
353 ,42	1	24,01	25,69	$4d'' ^3P^{\circ} - 5p'' ^3D$	2—1
057 ,45	2	20,51	22,27	$4d' ^1D^{\circ} - 5p ^3P$	2—1
977 ,95	3	23,38	25,15	$4d'' ^1D^{\circ} - 5p' ^1D$	2—2
818 ,13	1	23,34	25,15	$4d'' ^1P^{\circ} - 5p' ^1D$	1—2
793 ,53	3	22,35	24,17	$5s'' ^3P^{\circ} - 5p' ^3F$	2—3
728 ,41	1	24,01	25,85	4d" ³ P°—5p" ³ D	2-2
683 ,55	1	24,01	25,86	4d" ³ P°—5p" ³ S	2-1
651 ,75	10	20,46	22,33	5s' ³ D°—5p ³ P	3-2
602 ,90	10	22,68	24,56	4d" ¹ F°—5p' ³ P	3-2
444 ,70	1	21,72	23,65	4d" ³ F°—5p' ³ D	2-1
395,09	2	24,01	25,95	$4d'' ^{3}P^{\circ} - 5p'' ^{1}P$	2—1
310,22	10	22,60	24,56	$4d'' ^{3}D^{\circ} - 5p' ^{3}P$	1—2
250,98	5	20,29	22,27	$5s' ^{3}D^{\circ} - 5p ^{3}P$	2—1
164,76	1	24,01	26,02	$4d'' ^{3}P^{\circ} - 5p'' ^{3}D$	2—3
110,81	5.	20,24	22,27	$5s' ^{3}D^{\circ} - 5p ^{3}P$	1—1
078,38	10	20,29	22,33	$5s' ^3D^{\circ} - 5p ^3P$	2—2
050,11	3	22,60	24,65	$4d'' ^3D^{\circ} - 5p' ^3P$	1—0
037,17	10	22,60	24,65	$4d'' ^3D^{\circ} - 5p' ^3P$	1—1
935,03	8	22,47	24,56	$5s'' ^1P^{\circ} - 5p' ^3P$	1—2
891,72	5	20,24	22,35	$5s' ^3D^{\circ} - 5p ^3P$	1—0
873,50	1	23,58	25,69	$4d'' ^{3}P^{\circ} - 5p'' ^{3}D$	1-1
715,80	1	21,72	23,89	$4d'' ^{3}F^{\circ} - 5p' ^{3}D$	2-2
597,32	5	22,35	24,56	$5s'' ^{3}P^{\circ} - 5p' ^{3}P$	2-2
501,43	10	21,92	24,17	$4d'' ^{3}D^{\circ} - 5p' ^{3}F$	2-3
477,66	2	21,63	23,89	$4d' ^{3}D^{\circ} - 5p' ^{3}D$	3-2
475,49	1	21,38	23,65	$4d' \ ^{3}D^{\circ} - 5p' \ ^{3}D$	2—1
438,20	2	23,58	25,86	$4d'' \ ^{3}P^{\circ} - 5p'' \ ^{3}S$	1—1
412,19	5	24,01	26,30	$4d'' \ ^{3}P^{\circ} - 5p'' \ ^{1}D$	2—2
389,12	1	24,65	26,95	$5p' \ ^{3}P - 5d \ ^{3}D^{\circ}$	1—2
381,39	2	22,35	24,65	$5s'' \ ^{3}P^{\circ} - 5p' \ ^{3}P$	2—1
371 ,40	4	24,01	26,32	4d" ³ P°-5p" ³ P	2—1
362 ,11	1	21,72	24,03	4d" ³ F°-5p' ³ F	2—2
349 ,77	2	21,92	24,23	4d" ³ D°-5p' ¹ F	2—3

λ, Å	I	$E_{ m H}$, eV	$E_{_{ m B}}$, eV	Transition	J
5338,20	2	21,32	23,65	4d' ¹ P°—5p' ³ D	1—1
5263,18	1	21,68	24,03	4d" ³ F°—5p' ³ D	3—3
5257,83	2	23,34	25,69	$4d'' ^{1}P^{\circ} - 5p'' ^{3}D$	$ \begin{array}{r} 1 - 1 \\ 2 - 2 \\ 3 - 3 \\ 3 - 2 \\ 2 - 2 \end{array} $
5188,68	1	24,56	26,95	$5p' ^{3}P - 5d ^{3}D^{\circ}$	
5160,09	1	21,63	24,03	$4d' ^{3}D^{\circ} - 5p' ^{3}D$	
5152,01	3	21,63	24,03	$4d' ^{3}D^{\circ} - 5p' ^{3}F$	
5151,68	2	24,01	26,41	$4d'' ^{3}P^{\circ} - 5p'' ^{3}P$	
5110,98	1	23,58	26,01	$4d'' ^{3}P^{\circ} - 5p'' ^{3}P$	$ \begin{array}{r} 1 - 0 \\ 1 - 2 \\ 2 - 3 \\ 2 - 1 \\ 4 - 3 \end{array} $
5069,96	4	21,45	23,89	$4d' ^{3}S^{\circ} - 5p' ^{3}D$	
5061,46	2	21,72	24,17	$4d'' ^{3}P^{\circ} - 5p' ^{3}P$	
5042,86	2	21,19	23,65	$5s' ^{1}D^{\circ} - 5p' ^{3}D$	
5018,72	2	21,70	24,17	$4d'' ^{3}F^{\circ} - 5p'' ^{3}F$	
5016,45	20	22,68	25,45	$4d'' ^{1}F^{\circ} - 5p' ^{1}D$	3-2
4988,52	10	23,38	25,86	$4d'' ^{1}D^{\circ} - 5p'' ^{3}S$	2-1
4977,08	2	19,84	22,33	$4d' ^{3}G^{\circ} - 5p ^{3}P$	3-2
4965,78	2	21,68	24,47	$4d'' ^{3}F^{\circ} - 5p' ^{3}F$	3-3
4940,21	2	21,38	23,89	$4d' ^{3}D^{\circ} - 5p' ^{3}D$	2-2
4906,28	6	23,34	25,86	$4d'' ^{1}P^{\circ} - 5p'' ^{3}S$	1-1
4892,21	5	21,70	24,23	$4d'' ^{3}F^{\circ} - 5p' ^{1}F$	4-3
4873,87	1	21,63	24,17	$4d' ^{3}D^{\circ} - 5p' ^{3}F$	3-3
4845,62	2	21,70	24,26	$4d'' ^{3}F^{\circ} - 5p' ^{3}F$	4-4
4841,9	1	21,68	24,23	$4d'' ^{3}F^{\circ} - 5p' ^{1}F$	3-3
4826,08	2	23,38	25,95	$4d'''^{1}D^{\circ}-5p''^{1}P$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 3-3 \\ 1-4 \\ 1-1 \end{array} $
4789,74	7	21,45	24,03	$4d''^{3}S^{\circ}-5p'^{3}F$	
4754,48	6	21,63	24,23	$4d''^{3}D^{\circ}-5p'^{1}F$	
4749,00	2	23,34	25,95	$4d''^{1}P^{\circ}-5p''^{1}P$	
4729,72	4	21,45	24,07	$4d''^{3}S^{\circ}-5p'^{1}P$	
4710,48 4693,65 4673,80 4621,40 4565,51	10 3 3 1 1	21,63 23,38 21,38 22,47 23,58	24,26 26,02 24,03 26,15 26,30	$4d' \ ^{3}D^{\circ} - 5p' \ ^{3}F$ $4d'' \ ^{1}D^{\circ} - 5p'' \ ^{3}D$ $4d' \ ^{3}D^{\circ} - 5p' \ ^{3}F$ $5s'' \ ^{1}P^{\circ} - 5p' \ ^{1}D$ $4d'' \ ^{3}P^{\circ} - 5p'' \ ^{1}D$	$ \begin{array}{r} 3-4 \\ 2-3 \\ 2-2 \\ 1-2 \\ 1-2 \end{array} $
4537,25 4536,46 4518,64 4443,72 4443,28	$\begin{array}{c} 6 \\ 10 \\ 2 \\ 3 \\ 15 \end{array}$	21,92 23,58 21,32 21,38 21,10	24,65 26,32 24,07 24,17 23,89	$4d'' \ ^3D^{\circ} - 5p' \ ^3P$ $4d'' \ ^3P^{\circ} - 5p'' \ ^3P$ $4d' \ ^1P^{\circ} - 5p' \ ^1P$ $4d' \ ^3D^{\circ} - 5p' \ ^3F$ $4d' \ ^3D^{\circ} - 5p' \ ^3D$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 1-4 \\ 2-3 \\ 1-2 \end{array} $
4378,68	8	23,58	26,41	$4d'' \ ^3P^{\circ} - 5p'' \ ^3P$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-3 \\ 2-1 \\ 3-2 \end{array} $
4360,63	1	21,49	24,03	$5s' \ ^1D^{\circ} - 5p' \ ^3D$	
4344,24	8	21,38	24,23	$4d' \ ^3D^{\circ} - 5p' \ ^1F$	
4305,20	9	21,49	24,07	$5s' \ ^1D^{\circ} - 5p' \ ^1P$	
4294,83	10	21,68	24,56	$4d'' \ ^3F^{\circ} - 5p' \ ^3P$	
4244,33	5	23,38	26,30	$4d'' ^{1}D^{\circ} - 5p'' ^{1}D$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 3-2 \\ 1-2 \\ 3-2 \end{array} $
4233,72	1	21,72	24,65	$4d'' ^{3}F^{\circ} - 5p' ^{3}P$	
4232,82	2	22,92	25,85	$4d'' ^{3}D^{\circ} - 5p'' ^{3}D$	
4226,58	25	21,20	24,03	$4d' ^{3}D^{\circ} - 5p' ^{3}F$	
4225,92	20	21,63	24,56	$4d' ^{3}D^{\circ} - 5p' ^{3}P$	
4195,91	1	25,95	28,90	$5p'' ^{1}P - 6s' ^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-1 \\ 1-1 \\ 2-3 \end{array} $
4184,59	2	23,34	26,30	$4d'' ^{1}P^{\circ} - 5p'' ^{1}D$	
4171,79	15	18,79	21,76	$5s ^{3}S^{\circ} - 5p ^{5}P$	
4160,21	4	23,34	26,32	$4d'' ^{1}P^{\circ} - 5p'' ^{3}P$	
4154,46	40	20,29	24,17	$5s' ^{1}D^{\circ} - 5p' ^{3}F$	
4131,33	40	18,79	21,79	5s 3S°-5p 5P	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-2 \\ 3-3 \\ 1-2 \end{array} $
4067,37	50	21,19	24,23	5s'1D°-5p'1F	
4027,17	1	23,34	26,41	4d"1P°-5p"3F	
4002,61	15	22,92	26,02	4d"3D°-5p"3D	
3979,05	3	21,45	24,56	4d'3S°-5p'3P	
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λ, Å	I	E _H , eV	E _B , eV	Transition	J
3957,67 3938,53 3913,90 3898,70 3874,04	25 4 3 10 3	20,51 19,18 22,68 21,38 21,45	23,65 22,33 25,85 24,56 24,65	4d' ¹ D°-5p' ³ D 4d' ³ F°-5p ³ P 4d" ¹ F°-5p" ³ D 4d' ³ D°-5p' ³ P 4d' ³ S°-5p' ³ P	2-1 3-2 3-2 3-2 2-2 1-0
3868,70 3847,49 3835,37 3829,57 3809,16	40 3 2 1 7	21,45 22,47 19,04 21,92 22,60	24,65 25,69 22,27 25,15 25,85	$4d' \ ^3S^{\circ} - 5p' \ ^3P$ $5s'' \ ^1P^{\circ} - 5p'' \ ^3D$ $4d' \ ^3F^{\circ} - 5p \ ^3P$ $4d'' \ ^3D^{\circ} - 5p'' \ ^1D$ $4d'' \ ^3D^{\circ} - 5p'' \ ^3D$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 2 - 1 \\ 2 - 2 \\ 1 - 2 \end{array} $
3792,70 3769,69 3726,32 3699,98 3696,69	15 2 5 2 5	21,38 19,04 21,32 22,60 18,44	24,65 22,33 24,65 25,95 21,79	$4d' \ ^{3}D^{\circ} - 5p' \ ^{3}P$ $4d' \ ^{3}F^{\circ} - 5p \ ^{3}P$ $4d' \ ^{1}P^{\circ} - 5p' \ ^{3}P$ $4d'' \ ^{3}D^{\circ} - 5p'' \ ^{1}P$ $4d \ ^{3}D^{\circ} - 5p \ ^{5}P$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 1-1 \\ 1-1 \\ 3-2 \end{array} $
3690,65	30	20,29	23,65	5s' 3D°—5p' 3D	2-1
3674,23	4	21,19	24,56	5s' 1D°—5p' 3P	2-2
3671,14	1	22,92	26,30	4d" 3D°—5p" 1D	3-2
3670,23	4	20,51	23,89	4d' 1D°—5p' 3D	2-2
3655,77	1	22,47	25,86	5s" 1P°—4d" 3S	1-1
3641,34 3632,5 3615,82 3611,06 3603,96	$\begin{array}{c} 30 \\ 1 \\ 20 \\ 5 \\ 2 \end{array}$	20,24 22,60 20,46 21,72 18,32	23,65 26,01 23,89 25,15 21,76	5s' 3D°—5p' 3D 4d" 3D°—5p" 3P 5s' 3D°—5p' 3D 4d" 3F°—5p' 1D 4d 3D°—5p 5P	$ \begin{array}{c} 1-1 \\ 1-0 \\ 3-2 \\ 2-2 \\ 2-1 \end{array} $
3598,04	1	18,44	21,88	4d ³ D°—5p ⁵ P	3-3
3582,48	5	21,10	24,56	4d' ³ D°—5p' ³ P	1-2
3579,95	2	21,19	24,65	5s' ¹ D°—5p' ³ P	2-1
3567,72	15	22,47	25,95	5s" ¹ P°—5p" ¹ P	1-1
3564,23	100	18,79	22,27	5s ³ S°—5p ³ P	1-1
3562,09	$\begin{array}{c} 2 \\ 20 \\ 2 \\ 5 \\ 4 \end{array}$	21,68	25,15	4d" 3F°—5p' 1D	3-2
3549,42		22,92	26,41	4d" 3D°—5p" 3P	3-2
3537,20		22,35	25,85	5s" 3P°—5p" 3D	2-2
3524,78		22,35	25,86	5s" 3P°—5p" 3S	2-1
3521,11		20,51	24,03	4d' 1D°—5p' 3F	2-2
3514 ,55	15	21,63	25,45	4d' ³ D°-5p' ¹ D	$ \begin{array}{c} 3-2 \\ 1-2 \\ 1-0 \\ 1-1 \\ 2-1 \end{array} $
3507 ,42	200	18,79	22,33	5s ³ S°-5p ³ P	
3497 ,13	40	21,10	24,65	4d' ³ D°-5p' ³ P	
3492 ,80	8	21,10	24,65	4d' ³ D°-5p' ¹ P	
3488 ,59	100	20,51	24,07	4d' ¹ D°-5p' ¹ P	
3485,08	1	25,95	29,50	$5p'' ^{1}P - 5d' 1^{\circ}$ $5s' ^{3}D^{\circ} - 5p' ^{3}D$ $5s' ^{3}D^{\circ} - 5p' ^{3}F$ $5s'' ^{3}P^{\circ} - 5p'' ^{3}D$ $5s'' ^{3}P^{\circ} - 5p'' ^{3}D$	1-1
3474,65	70	20,46	24,03		3-3
3471,02	3	20,46	24,03		3-2
3448,71	10	22,10	25,69		1-1
3446,85	8	22,10	25,69		0-1
3442,86 3439,46 3428,83 3396,58 3388,93	$\begin{array}{c} 6 \\ 100 \\ 10 \\ 15 \\ 20 \end{array}$	22,35 20,29 22,68 20,24 20,51	25,95 23,89 26,30 23,89 24,17	$5s'' \ ^3P^{\circ} - 5p'' \ ^1P$ $5s' \ ^3D^{\circ} - 5p' \ ^3D$ $4d'' \ ^1F^{\circ} - 5p'' \ ^1D$ $5s' \ ^3D^{\circ} - 5p' \ ^3D$ $4d' \ ^1D^{\circ} - 5p' \ ^3F$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 3-2 \\ 1-2 \\ 2-3 \end{array} $
3374,96	40	22,35	26,02	$5s'' ^3P^{\circ} - 5p'' ^3D$	2-3
3351,93	100	18,07	21,76	$5s ^5S^{\circ} - 5p ^5P$	21
3348,47	10	22,60	26,30	$4d'' ^3D^{\circ} - 5p'' ^1D$	12
3342,48	50	20,46	24,17	$5s' ^3D^{\circ} - 5p' ^3F$	3-3
3332,50	10	22,60	26,32	$4d'' ^3D^{\circ} - 5p'' ^3P$	1-1
3330 ,76	60	20,51	24,23	4d' ¹ D°-5p' ¹ F	2—3
3325 ,75	200	18,07	21,79	5s ⁵ S°-5p ⁵ P	2—2
3311 ,47	50	20,29	24,03	5s' ³ D°-5p' ³ D	2—3

I	$E_{ m H}$, eV	E _B , eV	Transition	J
1	$25,15 \\ 20,29$	28,90	5p' 1D—6s' 3D°	2-2
20		24,03	5s' 3D°—5p' 3F	2-2
30	22,10	25,85	$5s'' \ ^3P^{\circ} - 5p'' \ ^3D$	1-2
4	22,10	25,86	$5s'' \ ^3P^{\circ} - 5p'' \ ^3S$	1-1
1	22,10	25,86	$5s'' \ ^3P^{\circ} - 5p'' \ ^3S$	0-1
30	20,46	24,23	$5s' \ ^3D^{\circ} - 5p' \ ^1F$	3-3
3	21,38	25,15	$4d' \ ^3D^{\circ} - 5p' \ ^1D$	2-2
$\begin{array}{c} 2\\ 30\\ 100\\ 150\\ 5 \end{array}$	20,29	24,07	$5s' \ ^{3}D^{\circ} - 5p' \ ^{1}P$	2—1
	18,48	22,27	$4d \ ^{3}D^{\circ} - 5p \ ^{3}P$	1—1
	20,24	24,03	$5s' \ ^{3}D^{\circ} - 5p' \ ^{3}F$	1—2
	20,46	24,26	$5s' \ ^{3}D^{\circ} - 5p' \ ^{3}F$	3—4
	22,60	26,41	$4d'' \ ^{3}D^{\circ} - 5p'' \ ^{3}P$	1—2
$ \begin{array}{r} 300 \\ 40 \\ 40 \\ 2 \\ 20 \end{array} $	18,07	21,88	$5s {}^{5}S^{\circ} - 5p {}^{5}P$	2-3
	20,24	24,07	$5s' {}^{3}D^{\circ} - 5p' {}^{1}P$	1-1
	22,47	26,30	$5s'' {}^{1}P^{\circ} - 5p' {}^{1}D$	1-2
	21,32	25,45	$4d' {}^{1}P^{\circ} - 5p' {}^{1}D$	1-2
	22,47	26,32	$5s'' {}^{1}P^{\circ} - 5p'' {}^{3}P$	1-1
3 10 20 80 100	18,48 22,10 22,10 20,29 18,24	22,33 25,95 25,95 24,47 22,33	$4d\ ^3D^{\circ}-5p\ ^3P$ $5s''\ ^3P^{\circ}-5p''\ ^1P$ $5s''\ ^3P^{\circ}-5p''\ ^3F$ $4d\ ^3D^{\circ}-5p\ ^3P$	1-2 1-1 0-1 2-3 3-2
$20 \\ 1 \\ 10 \\ 9 \\ 20$	22,10 25,15 21,92 22,47 21,92	26,01 29,08 25,85 26,41 25,86	$5s'' \ ^3P - 5p'' \ ^3P$ $5p' \ ^1D - 6s' \ ^3D^{\circ}$ $4d'' \ ^3D^{\circ} - 5p'' \ ^3P$ $5s'' \ ^1P^{\circ} - 5p'' \ ^3P$ $4d'' \ ^3D^{\circ} - 5p'' \ ^3S$	$ \begin{array}{r} 1 - 0 \\ 2 - 3 \\ 2 - 2 \\ 4 - 2 \\ 2 - 1 \end{array} $
60	18,32	22,27	$4d\ ^{3}D^{\circ}-5p\ ^{3}P$	2-1
15	20,29	24,23	$5s'\ ^{3}D^{\circ}-5p'\ ^{1}F$	2-3
10	22,35	26,30	$5s''\ ^{3}P^{\circ}-5p''\ ^{1}D$	2-2
100	21,19	25,45	$5s''\ ^{1}D^{\circ}-5p'\ ^{1}D$	2-2
20	22,35	26,32	$5s''\ ^{3}P^{\circ}-5p''\ ^{3}P$	2-1
30	21,72	25,69	$4d'' ^3F^{\circ} - 5p'' ^3D$	2-1
60	20,19	24,17	$4d' ^1G^{\circ} - 5p' ^3F$	4-3
40	18,32	22,33	$4d ^3D^{\circ} - 5p ^3P$	2-2
60	20,19	24,23	$4d' ^1G^{\circ} - 5p' ^1P$	4-3
3	20,51	24,56	$4d' ^1D^{\circ} - 5p' ^3P$	2-2
30	19,84	23,89	$4d' \ ^3G^{\circ} - 5p' \ ^3D$	3-2
50	22,35	26,41	$5s'' \ ^3P^{\circ} - 5p'' \ ^3P$	2-2
6	20,49	24,26	$4d' \ ^1G^{\circ} - 5p' \ ^3F$	4-4
80	20,46	24,56	$5s' \ ^3D^{\circ} - 5p' \ ^3P$	3-2
50	21,92	26,02	$4d'' \ ^3D^{\circ} - 5p'' \ ^3D$	2-3
6	21,72	25,85	$4d'' \ ^3F^{\circ} - 5p'' \ ^3D$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-1 \\ 4-3 \\ 3-2 \end{array} $
26	20,51	24,65	$4d' \ ^1D^{\circ} - 5p' \ ^3P$	
2	21,72	25,86	$4d'' \ ^3F^{\circ} - 5p'' \ ^3S$	
60	19,89	24,03	$4d'' \ ^3G^{\circ} - 5p'' \ ^3D$	
20	21,68	25,85	$4d''' \ ^3F^{\circ} - 5p''' \ ^3D$	
3	19,84	24,03	$4d' \ ^{3}G^{\circ} - 5p' \ ^{3}D$	$ \begin{array}{r} 3-3 \\ 3-2 \\ 4-2 \\ 2-1 \\ 4-1 \end{array} $
50	19,84	24,03	$4d' \ ^{3}G^{\circ} - 5p' \ ^{3}F$	
4	22,10	26,30	$5s'' \ ^{3}P^{\circ} - 5p'' \ ^{1}D$	
10	18,07	22,27	$5s'' \ ^{3}P^{\circ} - 5p'' \ ^{3}P$	
15	22,10	26,32	$5s'' \ ^{3}P^{\circ} - 5p'' \ ^{3}P$	
4	22,10	26,32	$5s'' \ ^3P^{\circ} - 5p'' \ ^3P$	0-1
20	21,63	25,85	$4d' \ ^3D^{\circ} - 5p'' \ ^3D$	3-2
10	21,72	25,95	$4d'' \ ^3F^{\circ} - 5p'' \ ^1P$	2-1
10	21,45	25,69	$4d' \ ^3S^{\circ} - 5p'' \ ^3D$	1-1
6	24,65	28,90	$5p' \ ^3P - 6s' \ ^3D^{\circ}$	1-2
	1 20 30 4 1 30 3 2 30 100 150 5 300 40 40 20 3 100 20 80 400 20 60 40 60 3 30 50 6 80 50 6 80 50 6 20 20 3 50 4 10 15 4 20 10 10	1 25,15 20 20,29 30 22,10 4 22,10 1 22,10 30 20,46 3 21,38 2 20,29 30 18,48 100 20,24 150 20,46 5 22,60 300 18,07 40 20,24 40 22,47 2 21,32 20 22,47 3 18,48 10 22,10 20 22,10 80 20,29 100 18,24 20 22,10 80 20,29 100 18,24 20 22,10 80 20,29 100 18,24 20 22,10 80 20,29 100 18,24 20 22,10 80 20,29 100 18,24 20 22,10 80 20,29 100 18,32 15 20,29 10 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,19 20 22,35 100 21,72 60 20,46 50 21,92 6 21,72 26 20,51 2 21,72 26 20,51	1 25,15 28,90 20 20,29 24,03 30 22,10 25,85 4 22,10 25,86 1 22,10 25,86 30 20,46 24,23 3 21,38 25,15 2 20,29 24,07 30 18,48 22,27 100 20,24 24,03 150 20,46 24,26 5 22,60 26,41 300 18,07 21,88 40 20,24 24,07 40 22,47 26,30 2 21,32 25,15 20 22,47 26,32 3 18,48 22,33 10 22,10 25,95 20 22,47 26,32 3 18,48 22,33 10 22,10 25,95 80 20,29 24,17 100 18,24 22,33 20 22,10 26,01 4 25,15 29,08 10 21,92 25,85 9 22,47 26,41 20 21,92 25,85 9 22,47 26,41 20 21,92 25,86 60 18,32 22,27 15 20,29 24,23 10 22,35 26,30 10 21,19 25,45 20 22,35 26,32 30 21,72 25,69 60 20,19 24,23 30 21,72 25,69 60 20,19 24,17 40 18,32 22,33 60 20,19 24,23 30 21,72 25,69 60 20,19 24,23 30 21,72 25,69 60 20,19 24,23 30 21,72 25,69 60 20,19 24,56 30 19,84 23,89 50 22,35 26,32 30 21,72 25,69 60 20,19 24,56 30 19,84 23,89 50 22,35 26,41 6 20,19 24,26 6 21,72 25,85 6 21,92 26,02 6 21,72 25,86 6 19,89 24,26 8 20,46 24,56 5 21,92 26,02 6 21,72 25,85 3 19,84 24,03 3 20,51 24,56 3 19,84 24,03 3 20,51 24,56 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85 3 19,84 24,03 3 20,168 25,85	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

λ, Å	I	E _H , eV	E_{B} , eV	Transition	J
2909,17	30	18,07	22,33	$5s {}^{5}S^{\circ} - 5p {}^{3}P$	2-2
2900,04	20	20,29	24,56	$5s' {}^{3}D^{\circ} - 5p' {}^{3}P$	2-2
2895,92	1	24,65	28,93	$5p' {}^{3}P - 5d' {}^{1}D^{\circ}$	1-2
2893,68	40	19,89	24,17	$4d' {}^{3}G^{\circ} - 5p' {}^{3}F$	4-3
2892,18	100	19,97	24,26	$4d' {}^{3}G^{\circ} - 5p' {}^{3}F$	5-4
2884 ,55	2	21,72	26,02	$4d'' ^3F^{\circ} - 5p'' ^3D$	2-3
2874 ,24	2	21,38	25,69	$4d' ^3D^{\circ} - 5p'' ^3D$	2-1
2872 ,85	5	22,10	26,41	$5s'' ^3P^{\circ} - 5p'' ^3P$	1-2
2870 ,61	50	21,70	26,02	$4d'' ^3F^{\circ} - 5p'' ^3D$	4-3
2859 ,05	4	19,84	24,17	$4d' ^3G^{\circ} - 5p' ^3F$	3-3
2856,09	$\begin{array}{c} 5 \\ 2 \\ 30 \\ 30 \\ 6 \end{array}$	24,56	28,90	$5p' \ ^{3}P - 6s' \ ^{3}D^{\circ}$	2-2
2853,22		21,68	26,02	$4d'' \ ^{3}F^{\circ} - 5p'' \ ^{3}D$	3-3
2851,16		19,89	24,23	$4d' \ ^{3}G^{\circ} - 5p' \ ^{1}F$	4-3
2841,00		20,29	24,65	$5s' \ ^{3}D^{\circ} - 5p' \ ^{3}P$	2-1
2835,94		21,32	25,69	$4d' \ ^{1}P^{\circ} - 5p'' \ ^{3}D$	1-1
2829,41 2822,63 2820,95 2817,53 2814,48	6 6 4 2 1 5	21,92 21,63 22,33 19,84 20,24	26,30 26,02 26,72 24,23 24,65	$4d'' \ ^{3}D^{\circ} - 5p'' \ ^{1}D$ $4d' \ ^{3}D^{\circ} - 5p'' \ ^{3}D$ $5p \ ^{3}P - 6s \ ^{5}S^{\circ}$ $4d' \ ^{3}G^{\circ} - 5p' \ ^{1}F$ $5s' \ ^{3}D^{\circ} - 5p' \ ^{3}P$	$ \begin{array}{c} 2-2 \\ 3-3 \\ 2-2 \\ 3-3 \\ 1-0 \end{array} $
2813,97	15	21,45	25,85	$4d' \ ^3S^{\circ} - 5p'' \ ^3D$	$ \begin{array}{r} 1-2 \\ 1-4 \\ 1-4 \\ 1-2 \\ 2-1 \end{array} $
2811,67	25	21,19	24,65	$5s' \ ^3D^{\circ} - 5p' \ ^3P$	
2806,07	20	21,45	25,86	$4d' \ ^3S^{\circ} - 5p'' \ ^3S$	
2785,26	2	22,27	26,72	$5p \ ^3P - 6s \ ^5S^{\circ}$	
2768,54	4	26,41	30,89	$5p'' \ ^3P - 6s'' \ ^3P^{\circ}$	
2765,90 2756,53 2750,36 2744,05 2743,03	2 8 10 2 3	21,38 21,92 21,19 22,33 22,33	25,86 26,41 25,69 26,84 26,84	$\begin{array}{c} 4d' \ ^{3}D^{\circ} - 5p'' \ ^{3}S \\ 4d'' \ ^{3}D^{\circ} - 5p'' \ ^{3}P \\ 5s' \ ^{1}D^{\circ} - 5p'' \ ^{3}D \\ 5p \ ^{3}P - 5d \ ^{5}D^{\circ} \\ 5p \ ^{3}P - 5d \ ^{5}D^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-1 \\ 2-1 \\ 2-2 \end{array} $
2742,05 2741,84 2730,41 2715,19 2710,27	5 2 5 7 2	24,56 22,33 21,32 21,38 22,27	29,08 26,85 25,86 25,95 26,84	$5p' \ ^{3}P - 6s' \ ^{3}D^{\circ}$ $5p \ ^{3}P - 5d \ ^{5}D^{\circ}$ $4d' \ ^{1}P^{\circ} - 5p'' \ ^{3}S$ $4d' \ ^{3}D \ ^{\circ} - 5p'' \ ^{1}P$ $5p \ ^{3}P - 5d \ ^{5}D^{\circ}$	$ \begin{array}{r} 2-3 \\ 2-3 \\ 1-1 \\ 2-1 \\ 1-1 \end{array} $
2709,02	1	26,32	30,89	$5p''' \ ^3P - 6s'' \ ^3P^{\circ} \ 4d''' \ ^3F^{\circ} - 5p'' \ ^1D \ 5p''' \ ^1D - 6s'' \ ^3P^{\circ} \ 4d'' \ ^3F^{\circ} - 5p'' \ ^3P \ 4d \ ^5D^{\circ} - 5p \ ^5P$	1-1
2708,34	1	21,72	26,30		2-2
2698,71	2	26,30	30,89		2-1
2698,07	3	21,72	26,32		2-1
2697,30	25	17,17	21,76		2-1
2696,59 2694,81 2691,86 2690,23	25 20 4 15	17,17 17,16 — 19,04	21,76 21,76 — 23,65 24,79	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 0—1 — 2—1 3—2
2681,19 2680,72 2680,32 2679,62 2676,00 2672,79	40 7 30 45 8 3	17,17 22,33 17,17 17,17 24,65 21,38	21,79 26,05 21,79 21,79 29,28 26,02	$5p \ ^{3}P - 5d \ ^{3}D^{\circ}$ $4d \ ^{5}D^{\circ} - 5p \ ^{5}P$ $4d \ ^{5}D^{\circ} - 5p \ ^{5}P$ $5p' \ ^{3}P - 6s' \ ^{1}D^{\circ}$ $4d' \ ^{3}D^{\circ} - 5p'' \ ^{3}D$	2-2 2-2 1-2 1-2 2-3
2670,67	20	20,51	25,45	$\begin{array}{c} 4d' ^{1}D^{\circ} - 5p' ^{1}D \\ 5s' ^{1}D^{\circ} - 5p'' ^{3}D \\ 4d' ^{3}D^{\circ} - 5p'' ^{1}D \\ 5s ^{1}D^{\circ} - 5p'' ^{3}S \\ 4d' ^{3}F^{\circ} - 5p' ^{3}D \end{array}$	2-2
2658,00	2	21,19	25,85		2-2
2653,66	4	21,63	26,30		3-2
2650,96	1	21,19	25,86		2-1
2648,69	10	19,35	24,03		4-3
2648,43	4	22,27	26,95	$5p ^3P - 5d ^3D^{\circ} 5s' ^3D^{\circ} - 5p' ^1D 5p'' ^3P - 6s'' ^3P^{\circ}$	1-2
2641,74	2	20,46	25,15		3-2
2641,00	4	26,41	31,11		2-2

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$\cdot 2$
-3 -3 -2 -2 2
2 1 2 2 3
3 2 1 3 3
2 1 2 1

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λ, Å	1	E _H , eV	E _B , eV	Transition	J
2453,28	8	21,79	26,84	5p 5P-5d 5D°	2-2
2452,29 2451,52	10 4	21 ,79 19 ,18	$26,85 \\ 24,23$	$5p\ ^{5}P-5d\ ^{5}D^{\circ}\ 4d'\ ^{3}F^{\circ}-5p'\ ^{1}F$	2—3 3—3
$2440,89 \\ 2440,05$	$\frac{5}{6}$	21,76 21,76	$26,84 \\ 26,84$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—0 1—1
2439,78	1	19,18	24,26	$4d' {}^3F^{\circ} - 5p' {}^3F$	3—4
2439,21	6	21,76	26,84	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
$2434,64 \\ 2431,04$	$\frac{2}{1}$	21,32 18,79	$26,41 \\ 23,89$	$5s {}^{3}S^{\circ} - 5p' {}^{3}D$	1—2 1—2
2428,92	1	17,17	22,27	$4d$ 5D ° $-5p$ 3P	1—1
$2427,48 \\ 2414,78$	1 1	17,16 19,04	$22,27 \\ 24,17$	$4d\ ^5D^{\circ}-5p\ ^3P\ 4d'\ ^3F^{\circ}-5p'\ ^3F$	0 —1 2 —3
2407,10	1 0	24,03	29,18	$5p' ^3D - 5d' ^1G^{\circ}$	3—4 3—4
$2403,\!65\ 2403,\!29$	3 1	17,17 21,79	$22,33 \\ 26,95$	$^{4d}^{5}D^{\circ}-^{5}p^{3}P \ ^{5}p^{5}P-^{5}d^{3}D^{\circ}$	3—4 2—2
2402,96	3	17,17	22,33	$4d ^5D^{\circ} - 5p ^3P$	2-2
2402 ,10 2401 ,58	$\frac{2}{1}$	$17,17 \\ 25,95$	22,33 $31,11$	$^{4d}_{5p"}^{5p}^{-5p}^{3P}_{5p"}^{1P} - 6s^{3P}^{\circ}$	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
$2400,10 \\ 2393,94$	4 40	$18,48 \\ 22,33$	24,65 27,50	$^{4d}_{5p}^{3}P - ^{5p'}_{5s}^{3}D$	1—1 2—1
2387,90	1	23,89	29,08	$5p' \ ^3D - 6s' \ ^3D^{\circ}$	2—1 2—3
2376,69	1	24,07	29,28	$5p' {}^{1}P - 6s' {}^{1}D^{\circ}$	1-2
$2368,19 \\ 2364,70$	4 1	$22,27 \\ 18,79$	$27,50 \\ 24,03$	5p 3P—6s 3S° 5s 3S°—5p′ 3F	$ \begin{array}{c} 1 - 1 \\ 1 - 2 \end{array} $
2363,26	3	25,86	31,11	5p" 3S—6s" 3P°	1—2
$2361,82 \\ 2360,14$	$\frac{4}{3}$	$24,03 \\ 24,03$	$29,28 \\ 29,28$	$\frac{5p'}{5p'}\frac{3F-6s'}{3D-6s'}\frac{1}{1}D^{\circ}$	$\begin{array}{c} 2-2 \\ 3-2 \end{array}$
2358,48	3	23,65	28,90	$5p' \ ^3D - 6s' \ ^3D^{\circ} 5p' \ ^3D - 5d' \ ^1D^{\circ}$	$\begin{array}{c} 1-2 \\ 1-2 \end{array}$
$2345,\!45\ 2329,\!22$	$\frac{6}{3}$	$23,65 \ 18,32$	$28,93 \\ 23,65$	$4d ^{3}D^{\circ} - 5p' ^{3}D$	2—1
2322,32	1	20,51	25,85	4d' 1D°—5p" 3D	$\begin{array}{c} 2-2 \\ 3-2 \end{array}$
2317,87 2303,00	$\frac{1}{2}$	$24,\!23$ $19,\!18$	$29,58 \\ 24,56$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2
2299,15 $2291,28$	3 3	$23,89 \\ 18,48$	$29,28 \\ 23,89$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-2 \\ 1-2 \end{array}$
2290,52	1	24,17	29,58	$5p'\ ^3F - 5d'\ 2^\circ$	3—2
2279,79	4	$\left\{ \begin{array}{c} 24,07 \\ 25,86 \end{array} \right.$	29,50 31,30	$\frac{5p'}{5p''} \frac{1}{3}P - 5d' \frac{1}{9}$ $\frac{5p''}{3}S - 6s'' \frac{1}{9}$	1—1 1—1
2273,76	3	18,44	23,89	$4d ^3D^{\circ} - 5p' ^3D$	3—2
$2259,76 \ 2232,35$	$\frac{6}{1}$	$21,88 \\ 24,03$	$27,37 \\ 29,58$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3 - 3 \\ 3 - 2 \end{array} $
2230,69	1	20,46	26,02	5s' ³ D°—5p" ³ D	3—3
$2219,14 \\ 2215,60$	$\frac{1}{2}$	$\substack{18,48\\18,44}$	$24,07 \\ 24,03$	$4d ^3D^{\circ} - 5p' ^1P$ $4d ^3D^{\circ} - 5p' ^3F$	$ \begin{array}{c} 1 - 1 \\ 3 - 2 \end{array} $
2172,25	1	18,32	24,03	$4d ^3D^{\circ} - 5p' ^3D$	$\begin{array}{c} 2 - 3 \\ 2 - 2 \end{array}$
2170,83	2	18,32	24,03	$4d ^3D^{\circ} - 5p' ^3F$	
$2162,50 \\ 2158,43$	3 1	$\substack{18,44\\18,32}$	24,17 24,07	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 3 - 3 \\ 2 - 1 \end{array} $
2148,58 2142,49	$\frac{2}{1}$	$\frac{18,79}{20,51}$	24,56 26,30	$5s {}^{3}S^{\circ} - 5p' {}^{3}P \ 4d' {}^{1}D^{\circ} - 5p'' {}^{1}D$	$\begin{array}{c} 1-2 \\ 2-2 \end{array}$
2138,70	1	18,44	24,23	$4d^{3}D^{\circ} - 5p'^{1}F$	3—3
2129 ,75	1	18,44	24,26	$4d ^3D^{\circ} - 5p' ^3F$	3-4
2116,00 1923,88	$\frac{1}{0}$	18,79 17,59	$24,65 \ 24,03$	5s ³ S°—5p′ ³ P 4p ⁵ ¹ P°—5p′ ³ F	$\begin{array}{c} 1 - 1 \\ 1 - 2 \end{array}$
1914,086	3	17,59	24,07 $22,27$	$4p^{5} {}^{1}P^{\circ} - 5p' {}^{1}P 4p^{5} {}^{3}P^{\circ} - 5p {}^{3}P$	1—1 0—1
1721,637	1	15,07		$4p^{5} {}^{3}P^{\circ} - 5p {}^{3}P$	1—1
1659,809 1647,359	$\frac{2}{2}$	14,80 14,80	$22,27 \\ 22,33$	$4p^{5} ^{3}P^{5} - 5p ^{3}P$ $4p^{5} ^{3}P^{\circ} - 5p ^{3}P$	$1-1 \\ 1-2$
					565

λ, Å	I	E _H , eV	E _B , eV	Transition	J
1638,816 1569,886 1558,802	$egin{array}{c} 3 \ 2 \ 3 \end{array}$	17,59 14,37 14,37	25,15 22,27 22,33	$\begin{array}{c} 4p^{5} {}^{1}P^{\circ} - 5p' {}^{1}D \\ 4p^{5} {}^{3}P^{\circ} - 5p {}^{3}P \\ 4p^{5} {}^{3}P^{\circ} - 5p {}^{3}P \end{array}$	1-2 $2-1$ $2-2$
1483,429 1423,553 1400,90 1377,833 1363,853	2 1 1 2 2	17,59 17,59 14,80 15,07 14,80	25,95 26,30 23,65 24,07 23,89	$4p^{5} {}^{1}P^{\circ} - 5p'' {}^{1}P$ $4p^{5} {}^{1}P^{\circ} - 5p'' {}^{1}D$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}D$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{1}P$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}D$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 1 \\ 0 - 1 \\ 1 - 2 \end{array} $
1342,678	1	14,80	24,03	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}F$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 0-1 \\ 2-3 \\ 2-2 \end{array} $
1302,586	2	14,37	23,89	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}D$	
1293,988	3	15,07	24,65	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}P$	
1283,798	3	14,37	24,03	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}D$	
1283,313	3	14,37	24,03	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}F$	
1278,943 1270,204 1265,315 1259,309 1258,745	1 5 4 3 3	14,37 14,80 14,37 14,80 14,80	24,07 24,56 24,17 24,65 24,65	$4p^{5} {}^{3}P^{\circ} - 5p' {}^{1}P$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}P$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}F$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}P$ $4p^{5} {}^{3}P^{\circ} - 5p' {}^{3}P$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 2-3 \\ 1-0 \\ 1-1 \end{array} $
1216,896	5	14,37	24,56	$4p^{5} ^{3}P^{\circ} - 5p' ^{3}P$ $4p^{5} ^{3}P^{\circ} - 5p' ^{3}P$ $4p^{4} ^{1}S - 4p^{5} ^{3}P^{\circ}$ $4p^{4} ^{1}D - 4p^{5} ^{3}P^{\circ}$ $4p^{4} ^{1}D - 4p^{5} ^{3}P^{\circ}$	2-2
1206,346	5	14,37	24,65		2-1
1158,724	6	4,10	14,80		0-1
987,281	18	1,82	14,37		2-2
954,774	4	1,82	14,80		2-1
919,143 897,801 876,674 870,825 862,578	2 40 22 20 35	4,10 0,56 0,66 0,56 0,00	17,59 14,37 14,80 14,80 14,37	$4p^{4} ^{1}S - 4p^{5} ^{1}P^{\circ}$ $4p^{4} ^{3}P - 4p^{5} ^{3}P^{\circ}$	0-1 $1-2$ $0-1$ $1-1$ $2-2$
854,733 837,666 785,968 768,104 750,986	25 22 25 1 4	0,56 0,66 1,82 4,10 0,66	15,07 14,80 17,59 20,24 17,17	$4p^4 \ ^3P - 4p^5 \ ^3P^\circ \ 4p^4 \ ^3P - 4p^5 \ ^3P^\circ \ 4p^4 \ ^1D - 4p^5 \ ^1P^\circ \ 4p^4 \ ^1S - 5s' \ ^3D^\circ \ 4p^4 \ ^3P - 4d \ ^5D^\circ $	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 2 - 1 \\ 0 - 1 \\ 0 - 1 \end{array} $
746,834	5	0,56	17,16	$4p^4 \ ^3P - 4d \ ^5D^\circ$	$ \begin{array}{c} 1-0 \\ 1-2, 1 \\ 2-3 \\ 2-1 \\ 0-1 \end{array} $
746,695	7	0,56	17,17	$4p^4 \ ^3P - 4d \ ^5D^\circ$	
745,763	3	1,82	18,44	$4p^4 \ ^1D - 4d \ ^3D^\circ$	
743,870	3	1,82	18,48	$4p^4 \ ^1D - 4d \ ^3D^\circ$	
732,259	4	0,66	17,59	$4p^4 \ ^3P - 4p^5 \ ^1P^\circ$	
730,264	3	1,82	18,79	$4p^{4} ^{1}D - 5s ^{3}S^{\circ}$	$ \begin{array}{c} 2-1 \\ 2-3, 2, 1 \\ 2-2 \\ 0-1 \\ 2-3 \end{array} $
722,036	50	0,00	17,17	$4p^{4} ^{3}P - 4d ^{5}D^{\circ}$	
719,85	1	1,82	19,04	$4p^{4} ^{1}D - 4d' ^{3}F^{\circ}$	
714,772	2	4,10	21,45	$4p^{4} ^{1}S - 4d' ^{3}S^{\circ}$	
713,999	7	1,82	19,18	$4p^{4} ^{1}D - 4d' ^{3}F^{\circ}$	
708,356	8	0,56	18,07	$4p^4 \ ^3P - 5s \ ^5S^{\circ}$	1-2
704,838	4	0,00	17,59	$4p^4 \ ^3P - 4p^5 \ ^1P^{\circ}$	2-1
698,037	20	0,56	18,32	$4p^4 \ ^3P - 4d^{\prime} \ ^3D^{\circ}$	1-2
695,604	15	0,66	18,48	$4p^4 \ ^3P - 4d^{\prime} \ ^3D^{\circ}$	0-1
691,919	18	0,56	18,48	$4p^4 \ ^3P - 4d^{\prime} \ ^3D^{\circ}$	1-1
687,979	11	1,82	19,84	$4p^{4} ^{1}D - 4d' ^{3}G^{\circ}$	$ \begin{array}{r} 2 - 3 \\ 2 - 2 \\ 0 - 1 \\ 1 - 1 \\ 2 - 2 \end{array} $
686,254	20	0,00	18,07	$4p^{4} ^{3}P - 5s ^{5}S^{\circ}$	
683,666	18	0,66	18,79	$4p^{4} ^{3}P - 5s ^{3}S^{\circ}$	
680,119	22	0,56	18,79	$4p^{4} ^{3}P - 5s ^{3}S^{\circ}$	
676,564	25	0,00	18,32	$4p^{4} ^{3}P - 4d ^{3}D^{\circ}$	
674,828	8	4,10	22,47	$4p^{4} ^{1}S - 5s'' ^{1}P^{\circ}$	0-1 $2-1$ $2-3$ $2-2$ $1-2$
672,826	7	1,82	20,24	$4p^{4} ^{1}D - 5s' ^{3}D^{\circ}$	
672,330	25	0,00	18,44	$4p^{4} ^{3}P - 4d' ^{3}D^{\circ}$	
671,175	7	1,82	20,29	$4p^{4} ^{1}D - 5s' ^{3}D^{\circ}$	
671,058	7	0,56	19,04	$4p^{4} ^{3}P - 4d' ^{3}F^{\circ}$	

λ, Å	I	E _H , eV	E _B , eV	Transition	J
670,813	3	0,00	18,48	$4p^4 ^3P - 4d ^3D^\circ$	2-1
670,300	4	4,10	22,60	$4p^4 ^1S - 4d'' ^3D^\circ$	0-1
664,844	11	1,82	20,46	$4p^4 ^1D - 5s' ^3D^\circ$	2-3
663,039	20	1,82	20,51	$4p^4 ^1D - 4d ^1D^\circ$	2-2
659,716	22	0,00	18,79	$4p^4 ^3P - 5s ^3S^\circ$	2-1
651,198	8	0,00	19,04	$4p^4 ^3P - 4d' ^3F^\circ$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 0-1 \\ 2-1 \\ 2-2 \end{array} $
646,417	20	0,00	19,18	$4p^4 ^3P - 4d' ^3F^\circ$	
644,521	1	4,10	23,34	$4p^4 ^1S - 4d'' ^1P^\circ$	
642,84	1	1,82	21,10	$4p^4 ^1D - 4d' ^3D^\circ$	
639,981	15	1,82	21,19	$4p^4 ^1D - 5s' ^1D^\circ$	
636,348	1	4,10	23,58	$4p^{4} ^{1}S - 4d'' ^{3}P^{\circ}$ $4p^{4} ^{1}D - 4d' ^{3}D^{\circ}$ $4p^{4} ^{3}P - 5s' ^{3}D^{\circ}$ $4p^{4} ^{1}D - 4d' ^{3}S^{\circ}$ $4p^{4} ^{3}P - 5s' ^{3}D^{\circ}$	0-1
633,631	5	1,82	21,38		2-2
633,082	7	0,66	20,24		0-1
631,550	7	1,82	21,45		2-1
630,037	15	0,56	20,24		1-1
628,581 625,758 625,011 624,268 622,795	15 13 9 3 11	0,56 1,82 0,00 1,82 1,82	20,29 21,63 19,84 21,68 21,72	$4p^4 \ ^3P - 5s' \ ^3D^\circ$ $4p^4 \ ^1D - 4d' \ ^3D^\circ$ $4p^4 \ ^3P - 4d' \ ^3G^\circ$ $4p^4 \ ^1D - 4d'' \ ^3F^\circ$ $4p^4 \ ^1D - 4d'' \ ^3F^\circ$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 2-3 \\ 2-3 \\ 2-2 \end{array} $
621,448 616,728 612,485 611,187 611,100	8 5 6 8 9	0,56 1,82 0,00 1,82 0,00	20,51 21,92 20,24 22,10 20,29	$4p^{4} ^{3}P - 4d' ^{1}D^{\circ}$ $4p^{4} ^{1}D - 4d'' ^{3}D^{\circ}$ $4p^{4} ^{3}P - 5s' ^{3}D^{\circ}$ $4p^{4} ^{1}D - 5s'' ^{3}P^{\circ}$ $4p^{4} ^{3}P - 5s' ^{3}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-1 \\ 2-1 \\ 2-2 \\ \end{array} $
606,460	9	0,66	21,10	$4p^4 \ ^3P - 4d' \ ^3D^{\circ}$ $4p^4 \ ^3P - 5s'' \ ^3D^{\circ}$ $4p^4 \ ^3P - 4d' \ ^1D^{\circ}$ $4p^4 \ ^1D - 5s'' \ ^3P^{\circ}$ $4p^4 \ ^3P - 4d' \ ^3D^{\circ}$	0—1
605,862	9	0,00	20,46		2—3
604,355	4	0,00	20,51		2—2
603,849	6	1,82	22,35		2—2
603,666	7	0,56	21,10		1—1
601,134	7	0,56	21,19	$4p^{4} ^{3}P - 5s' ^{1}D^{\circ}$ $4p^{4} ^{1}D - 5s'' ^{1}P^{\circ}$ $4p^{4} ^{3}P - 4d' ^{1}P^{\circ}$ $4p^{4} ^{3}P - 4d' ^{1}P^{\circ}$ $4p^{4} ^{1}D - 4d'' ^{3}D^{\circ}$	1-2
600,167	5	1,82	22,47		2-1
599,944	4	0,66	21,32		0-1
597,194	6	0,56	21,32		1-1
596,576	6	1,82	22,60		2-1
596,401	6	0,66	21,45	$4p^{4} ^{3}P - 4d' ^{3}S^{\circ}$ $4p^{4} ^{3}P - 4d' ^{3}D^{\circ}$ $4p^{4} ^{1}D - 4d'' ^{1}F^{\circ}$ $4p^{4} ^{3}P - 4d' ^{3}S^{\circ}$ $4p^{4} ^{3}P - 4d' ^{3}D^{\circ}$	0-1
595,530	7	0,56	21,38		1-2
594,090	9	1,82	22,68		2-3
593,699	7	0,56	21,45		1-1
587,543	4	0,00	21,10		2-1
587,374	4	1,82	22,92	$4p^{4} ^{1}D - 4d'' ^{3}D^{\circ}$	2—3
585,950	8	0,56	21,72	$4p^{4} ^{3}P - 4d'' ^{3}F^{\circ}$	1—2
585,140	8	0,00	21,19	$4p^{4} ^{3}P - 5s' ^{1}D^{\circ}$	2—2
580,577	6	0,56	21,92	$4p^{4} ^{3}P - 4d'' ^{3}D^{\circ}$	1—2
579,823	6	0,00	21,38	$4p^{4} ^{3}P - 4d' ^{3}D^{\circ}$	2—2
578,220 578,09 576,076 575,716 574,956	5 0 4 5 5	0,66 0,00 1,82 0,56 1,82	22,10 21,45 23,34 22,10 23,38	$4p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $4p^{4} ^{3}P - 4d' ^{3}S^{\circ}$ $4p^{4} ^{1}D - 4d'' ^{1}P^{\circ}$ $4p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$ $4p^{4} ^{1}D - 4d'' ^{1}D^{\circ}$	0-1 $2-1$ $2-1$ $1-1$, 0 $2-2$
573,228	13	0,00	21,63	$4p^{4} ^{3}P - 4d' ^{3}D^{\circ}$	2-3
571,983	15	0,00	21,68	$4p^{4} ^{3}P - 4d'' ^{3}F^{\circ}$	2-3
570,738	4	0,00	21,72	$4p^{4} ^{3}P - 4d'' ^{3}F^{\circ}$	2-2
569,156	7	0,56	22,35	$4p^{4} ^{3}P - 5s'' ^{3}P^{\circ}$	1-2
565,879	4	0,56	22,47	$4p^{4} ^{3}P - 5s'' ^{1}P^{\circ}$	1-1
565,640 565,424 562,690	5 4 5	$\begin{array}{c} 0,00 \\ 0,66 \\ 0,56 \end{array}$	21,92 22,60 22,60	$4p^4 ^3P - 4d'' ^3D^\circ \ 4p^4 ^3P - 4d'' ^3D^\circ \ 4p^4 ^3P - 4d'' ^3D^\circ$	2—2 0—1 1—1

λ, Å	I	E _H , eV	EB, eV	Transition	J
560,986	5	0,00	22,10	4p4 3P-5s" 3P°	2—1
558,634	15	1,82	24,01	$4p^{4} {}^{1}D - 4d'' {}^{3}P^{\circ}$	2—2
554,794	7	0,00	22,35	4p4 3P-5s" 3P°	2—2
689, 155	4	00,00	22,47	$4p^{4} ^{3}P - 5s'' ^{1}P^{\circ}$	2-1
548,652	5	0,00	22,60	$4p^4 ^3P - 4d'' ^3D^{\circ}$	2-1
546 ,686	5	0,66	23,34	$4p^{4} ^{3}P - 4d'' ^{1}P^{\circ}$	0-1
546,547	6	00,00	22,68	$4p^{4} {}^{3}P - 4d'' {}^{1}F^{\circ}$	2—3
544,413	5	0,56	23,34	4p4 3P-4d" 1P°	1-1
543,420	8	0,56	23,38	4p4 3P—4d" 1D°	1-2
540,860	4	0,00	22,92	$4p^{4} ^{3}P - 4d'' ^{3}D^{\circ}$	2—3
788, 540	5	0,66	23,58	$4p^{4} ^{3}P - 4d'' ^{3}P^{\circ}$	0-1
538,544	8	$0,\!56$	23,58	$4p^4 ^3P - 4d'' ^3P^{\circ}$	1—1
531,255	4	0,00	23,34	$4p^{4} ^{3}P - 4d'' ^{1}P^{\circ}$	2—1
306, 306	6	0,00	23,38	$4p^4 ^3P - 4d'' ^1D^{\circ}$	2-2
528,811	4	0,56	24,01	$4p^4 \ ^3P - 4d'' \ ^3P^{\circ}$	1-2
525,687	4	0,00	23,58	$4p^4 ^3P - 4d'' ^3P^{\circ}$	2-1
516 ,384	4	0,00	24,01	$4p^{4} ^{3}P - 4d'' ^{3}P^{\circ}$	2—2

Kr IV, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^{34}S^0_{3/2}$

λ, Å	I	E_{H} , eV	$E_{\rm B}$, eV	Transition	J
3934 ,29 3860 ,58 3809 ,30 3261 ,70 3224 ,99	5 5 3 3 6	22,63 22,63 22,63 22,04 22,04	25,78 25,84 25,89 25,84 25,89	$4d\ 12-5p\ ^4P^\circ \ 4d\ 12-5p\ ^4P^\circ \ 4d\ 12-5p\ ^4P^\circ \ 4d\ 11-5p\ ^4P^\circ \ 4d\ 11-5p\ ^4P^\circ \ 4d\ 11-5p\ ^4P^\circ \ $	$ \begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2, 5/2 - 3/2 \\ 3/2, 5/2 - 5/2 \end{array} $
3199,91 3142,01 2983,22 2859,3 2856,2	2 3 2 3 2	21,45 21,38 20,98 21,45 21,38	25,32 25,32 25,13 25,78 25,72	$4d\ 9-5p\ ^4D^{\circ}\ 5s\ ^4P-5p\ ^4D^{\circ}\ 5s\ ^4P-5p\ ^4D^{\circ}\ 4d\ 9-5p\ ^4D^{\circ}\ 5s\ ^4P-5p\ ^4D^{\circ}$	$^{1/2}, \ ^{3/2}_{5/2} - ^{3/2}_{3/2} \\ ^{3/2}_{2} - ^{1/2}_{2} \\ ^{1/2}, \ ^{3/2}_{2} - ^{1/2}_{2} \\ ^{5/2}_{2} - ^{5/2}$
2853,0 2836,08 2829,60 2774,70 2748,18	5 3 3 6 8	20,98 21,52 21,52 21,38 21,38	25,32 25,89 25,90 25,84 25,89	5s ⁴ P—5p ⁴ D° 4d 10—5p ⁴ P° 4d 10—5p ⁴ S° 5s ⁴ P—5p ⁴ P° 5s ⁴ P—5p ⁴ P°	3/2, $3/23/2$, $5/2$, $5/23/2$, $5/2$, $3/25/2$, $3/25/2$, $3/25/2$, $5/2$
2742,13 2736,65 2733,36 2730,55 2673,0	2 2 2 3 2	21,38 20,79 21,52 20,59 21,26	25,90 25,32 26,05 25,13 25,90	5s ⁴ P—5p ⁴ S° 4d 4—5p ⁴ D° 4d 10—5p 1° 5s ⁴ P—5p ⁴ D° 4d 8—5p ⁴ S°	$\begin{array}{c} 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2, 5/2 - 3/2, 5/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \end{array}$
2651,6 2621,11 2615,3 2609,5 2606,17	2 7 8 10 5	21,38 20,59 20,98 21,38 20,57	26,05 25,32 25,72 26,13 25,32	$5s ^4P - 5p 1^{\circ}$ $5s ^4P - 5p ^4D^{\circ}$ $5s ^4P - 5p ^4D^{\circ}$ $5s ^4P - 5p ^4D^{\circ}$ $4d 2 - 5p ^4D^{\circ}$	$\begin{array}{c} 5/2 - 3/2, 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2, 5/2 - 3/2 \end{array}$
2586 ,9 2579 ,0 2558 ,08 2547 ,0 2546 ,0	3 2 4 6 5	21,26 20,98 21,26 20,98 21,26 21,18	26,05 25,78 26,11 25,84 26,13 26,05	$4d 8-5p 1^{\circ}$ $5s ^{4}P-5p ^{4}P^{\circ}$ $4d 8-5p 2^{\circ}$ $5s ^{4}P-5p ^{4}P^{\circ}$ $4d 8-5p ^{4}D^{\circ}$ $4d 7-5p 1^{\circ}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
568	Ŭ	21,10	-0,00	30 1 Op 1	72, 72 72, 72

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2546,0 2524,5 2519,38 2518,02 2517,0	5 5 6 5 4	20,85 20,98 20,98 21,18 20,79	25,72 25,89 25,90 26,11 25,72	$4d\ 6-5p\ ^4D^\circ \ 5s\ ^4P-5p\ ^4P^\circ \ 5s\ ^4P-5p\ ^4S^\circ \ 4d\ 7-5p\ 2^\circ \ 4d\ 4-5p\ ^4D^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2510,2 2474,06 2459,74 2451,7 2442,68	2 5 6 4 5	20,38 21,38 20,85 20,83 20,98	25,32 26,39 25,89 25,89 26,05	$4d\ 1-5p\ ^4D^{\circ} \ 5s\ ^4P-5p\ 3^{\circ} \ 4d\ 6-5p\ ^4P^{\circ} \ 4d\ 5-5p\ ^4P^{\circ} \ 5s\ ^4P-5p\ 1^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2432,8 2428,04 2416,9 2406,42 2388,05	1 3 4 2 3	$20,79 \\ 20,79 \\ 20,59 \\ 20,98 \\ 20,57 \\ 20,59$	25,89 25,90 25,72 26,11 25,72 25,78	$4d\ 4-5p\ ^4P^\circ\ 4d\ 4-5p\ ^4S^\circ\ 4d\ 3-5p\ ^4D^\circ\ 5s\ ^4P-5p\ 2^\circ\ 4d\ 2-2p\ ^4D^\circ\ 5s\ ^4P-5p\ ^4P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2360 ,4 2358 ,5 2348 ,27 2340 ,93 2339 ,15	2 3 4 2 2	20,59 20,59 20,85 20,83 20,59	25,84 25,84 26,13 26,13 25,89	$4d\ 3-5p\ ^4P^\circ\ 4d\ 3-5p\ ^4P^\circ\ 4d\ 6-5p\ ^4D^\circ\ 4d\ 5-5p\ ^4D^\circ\ 4d\ 3-5p\ ^4P^\circ$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2336,75 2329,3 2324,85 2323,57 2291,26	4 3 1 1 6	20,59 20,57 20,57 20,79 20,98	25,90 25,89 25,90 26,13 26,39	$5s ^4P - 5p ^4S^{\circ} \ 4d 2 - 5p ^4P^{\circ} \ 4d 2 - 5p ^4S^{\circ} \ 4d 4 - 5p ^4D^{\circ} \ 5s ^4P - 5p 3^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2259,42 2252,54 2237,34 842,035 816,822 805,763	1 2 3 22 18 7	20,57 20,38 20,57 0,00 0,00 0,00	26,05 25,89 26,11 14,72 15,18 15,39	$4d\ 2-5p\ 1^{\circ}$ $4d\ 1-5p\ ^{4}P^{\circ}$ $4d\ 2-5p\ 2^{\circ}$ $4p^{3}\ ^{4}S^{\circ}-4p^{4}\ ^{4}P^{\circ}$ $4p^{3}\ ^{4}S^{\circ}-4p^{4}\ ^{4}P^{\circ}$ $4p^{3}\ ^{4}S^{\circ}-4p^{4}\ ^{4}P^{\circ}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Kr V, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^2 {}^3P_0$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
708,85 472,16	8	_	_	_	_

Kr VI, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^2 P_{1/2}^0$

λ, Α	I	E _H , eV	E _B , eV	Transition	J
742,83	8	_	_	$4p\ ^{2}P^{\circ}$ — $4p^{2}\ ^{2}D$	³ / ₂ — ⁵ / ₂
705,84	8	_	_	$4p^{2}P^{\circ}-4p^{2}^{2}D$	$^{1}/_{2}$ — $^{3}/_{2}$
580,63	2	_		$4p^{2}P^{\circ}-4p^{2}^{2}P$	³ / ₂ — ¹ / ₂
569,13	5	_	_	$4p ^{2}P^{\circ} - 4p^{2} ^{2}P$	$^{3}/_{2}$ — $^{3}/_{2}$
554,52	5	_	_	$4p^{2}P^{\circ}-4p^{2}^{2}P$	$^{1}/_{2}$ — $^{1}/_{2}$

λ, Α	I	$E_{ m H}$ eV	E _B . eV	Transition	J
544,03 465,27 450,20	5 6	<u> </u>		$4p^{2}P^{\circ}-4p^{2}^{2}P$ $4p^{2}P^{\circ}-4d^{2}D$ $4p^{2}P^{\circ}-4d^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$

Kr VII, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 {}^1S_0$

λ, λ	I	$E_{ m H}^{},~{ m eV}$	E _B . eV	Transition	J
618,67 585,37	1 8		_	$4p\ ^3P^{\circ}-4p^2\ ^3P\ 4s^2\ ^1S-4p\ ^1P^{\circ}$	2-2 0-1

Kr VIII, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 S_{1/2}$

λ, Α	I	$E_{ m R},\;{ m eV}$	E _B , eV	Transition	J
695,91 651,57	8 10	<u>-</u>		4s ² S-4p ² P° 4s ² S-4p ² P°	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$

XENON, Z = 54

Xe I, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^{64} S_0$ Ionization potential 97 834,4 cm⁻¹; 12,129 eV

λ, Α	I	E _H , eV	E _B , eV	Transition	J
26511,1 26272,0 24825,3 23195,5 20262,2	30 60 20 10 6	9,93 9,69 9,72 9,69 9,79	10,40 10,16 10,22 10,22 10,40	$\begin{array}{c} 6p \ [^{1}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 5d \ [^{2}/_{2}]^{\circ} \\ 6p \ [^{4}/_{2}] - 5d \ [^{4}/_{2}]^{\circ} \end{array}$	0-1 2-2 3-3 2-3 1-1
18788,0 17325,5 16727,52 16052,02 15418,01	3 5 50 50 110	9,93 9,69 9,82 9,82 9,79	10,60 10,40 10,56 10,60 10,60	$\begin{array}{c} 6p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 5d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-1$ $2-2$ $2-1$ $1-1$
14732,38 14659,84 14364,90 14241,39 14142,09	200 5 20 40 80	9,72 10,16 10,40 10,40 9,69	10,56 11,00 11,26 11,27 10,56	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \end{array}$	3-2 $ 2-1 $ $ 1-2 $ $ 1-2 $ $ 2-2$
13656,48 13543,16 12623,32 12590,00 12451,21	$ \begin{array}{r} 150 \\ 5 \\ 300 \\ 26 \\ 2 \end{array} $	9,96 10,04 9,58 9,92 9,96	10,60 10,95 10,56 10,90 10,95	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-1 \\ 3-2 \\ 1-2 \\ 1-1 \\ 2-2 \end{array} $
12258,10 12235,14 12084,82 11952,57 11951,1	$\begin{array}{c} 6 \\ 80 \\ 20 \\ 10 \\ 1 \end{array}$	9,89 9,58 9,94 9,96 9,92	10,90 10,60 10,97 10,99 10,95	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 7s \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{3}/_{2}]^{\circ} - 7p \ [^{2}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [^{2}/_{2}] \end{array}$	0-1 $1-1$ $4-3$ $2-2$ $1-2$
11911,44 11874,36 11857,86 11857,00 11793,04	$\begin{array}{c} 3 \\ 4 \\ 2 \\ 30 \\ 40 \end{array}$	9,92 $10,22$ $9,93$ $10,22$ $10,22$	10,96 11,26 10,98 11,26 11,27	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 5d \ [^{21}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{21}/_{2}]^{\circ} - 4f \ [^{41}/_{2}] \\ 5d \ [^{21}/_{2}]^{\circ} - 4f \ [^{21}/_{2}] \end{array}$	1—1 3—2 0—1 3—4 3—3
11742,01 11614,08 11537,4 11491,22 11415,04	90 25 1 15 15	10,22 9,89 10,40 9,92 9,92	11,27 10,96 11,47 10,99 11,00	$\begin{array}{c} 5d \ [2^{1}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [4^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [4^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [4^{1}/_{2}] \end{array}$	3-4 0-1 4-0 1-2 1-1
11309,56 11289,10 11214,89 11175,5 11162,67	5 10 5 1 10	9,96 9,92 10,16 10,56 9,96	11,05 11,01 11,26 11,67 11,07	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \\ 7s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 6p' \ [1/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-0 \\ 2-1 \\ 2-3 \\ 2-1 \end{array} $
11141,09 11130,81 11127,20 11085,25 10895,32	50 8 100 250 200	9,89 10,16 10,16 10,16 9,92	11,00 11,27 11,27 11,27 11,05	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5d \ [^{2}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 5d \ [^{2}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 5d \ [^{2}/_{2}]^{\circ} - 4f \ [3^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \end{array}$	0-1 $2-3$ $2-2$ $2-3$ $1-2$
10838,34 10758,86 10706,78 10549,76 10527,84	1000 100 150 20 40	8,44 9,92 9,82 40,40 9,82	9,58 11,07 10,98 11,58 11,00	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 6p \ [1/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 5d \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 2 - 1 \\ 1 - 2 \\ 2 - 2 \end{array} $
10515 ,15 10507 ,91 10484 ,83	10 6 8	$9,89 \\ 10,40 \\ 9,79$	11,07 11,58 10,97	$\begin{array}{c} 5d \ [1/_2]^{\circ} - 6p' \ [1/_2] \\ 5d \ [1^{1}/_2]^{\circ} - 5f \ [2^{1}/_2] \\ 6p \ [1^{1}/_2] - 6d \ [^{1}/_2]^{\circ} \end{array}$	0—1 1—2 1—0

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λ, Å	I	E _H , eV	$E_{_{ m B}}$, eV	Transition	J
10420,52 10251,07 10188,36 10125,47 10119,8 10107,34	1 20 10 20 1 80	9,79 9,79 9,82 9,92 10,04 10,04	10,98 11,00 11,04 11,14 11,26 11,26	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 6p \ [4^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [4^{1}/_{2}] - 6d \ [3^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 4f \ [4^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 4f \ [4^{1}/_{2}] \end{array}$	1-1 1-2 2-3 1-0 3-2 3-4
10084,79 10060,96 10057,96 10023,72 9966,58 9923,192	20 10 5 50 10 3000	9,93 10,04 10,04 10,04 9,82 8,44	11,16 11,27 11,27 11,27 11,06 9,69	$\begin{array}{c} 6p \ [^{1}/_{2}] - 6d \ [^{11}/_{2}]^{\circ} \\ 5d \ [^{31}/_{2}]^{\circ} - 4f \ [^{21}/_{2}] \\ 5d \ [^{31}/_{2}]^{\circ} - 4f \ [^{21}/_{2}] \\ 5d \ [^{31}/_{2}]^{\circ} - 4f \ [^{31}/_{2}] \\ 6p \ [^{11}/_{2}] - 6d \ [^{21}/_{2}]^{\circ} \\ 6s \ [^{11}/_{2}]^{\circ} - 6p \ [^{21}/_{2}] \end{array}$	0-1 3-3 3-2 3-3, 4 2-2 1-2
9799,699 9718,16 9710,03 9700,99 9685,32	$2000 \\ 100 \\ 2 \\ 20 \\ 150$	8,31 9,79 10,16 9,72 9,82	9,58 11,06 11,43 11,00 11,10	$\begin{array}{c} 6s \left[1^{1}/_{2} \right] ^{\circ} - 6p \left[1^{1}/_{2} \right] \\ 6p \left[1^{1}/_{2} \right] - 6d \left[2^{1}/_{2} \right] ^{\circ} \\ 5d \left[2^{1}/_{2} \right] ^{\circ} - 8p \left[2^{1}/_{2} \right] \\ 6p \left[2^{1}/_{2} \right] - 6d \left[1^{1}/_{2} \right] ^{\circ} \\ 6p \left[1^{1}/_{2} \right] - 6d \left[2^{1}/_{2} \right] ^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 2-2 \\ 3-2 \\ 2-3 \end{array} $
9605,80 9585,14 9513,379 9505,78 9497,07	$\begin{array}{c} 3 \\ 20 \\ 200 \\ 10 \\ 40 \end{array}$	10,16 9,69 9,72 9,96 9,96	11,45 10,98 11,02 11,26 11,26	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 2-1 \\ 3-4 \\ 2-1 \\ 2-2 \end{array} $
9487,76 9445,34 9442,68 9441,46 9412,01	4 80 20 20 60	9,96 9,96 9,69 9,72	11,27 11,27 11,00 11,04	$\begin{array}{c} - \\ 5d \ [4^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 5d \ [4^{1}/_{2}]^{\circ} - 4f \ [2^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 6d \ [4^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 6d \ [3^{1}/_{2}]^{\circ} \end{array}$	
9374,76 9374,02 9334,08 9306,64 9301,95	100 10 3 40 30	9,94 9,94 9,94 9,57 9,94	11,26 11,26 11,27 10,90 11,27	$5d \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}^{\circ} - 4f \begin{bmatrix} 4^{1}/_{2} \end{bmatrix}$ $5d \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}^{\circ} - 4f \begin{bmatrix} 4^{1}/_{2} \end{bmatrix}$ $5d \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}^{\circ} - 4f \begin{bmatrix} 2^{1}/_{2} \end{bmatrix}$ $6s' \begin{bmatrix} 1/_{2} \end{bmatrix}^{\circ} - 7p \begin{bmatrix} 1/_{2} \end{bmatrix}$ $5d \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}^{\circ} - 4f \begin{bmatrix} 3^{1}/_{2} \end{bmatrix}$	4—5 4—4 4—3 1—1 4—3, 4
9245,18 9222,39 9216,51 9211,38 9203,20	3 5 1 25 30	9,93 9,72 10,40 9,92 9,92	11,27 11,06 11,75 11,26 11,26	$\begin{array}{c} 6p \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2^{1}}/_{2}] - 6d \ [^{2^{1}}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6f \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \end{array}$	0-1 3-2 1-2 1-1 1-2
9197,18 9167,52 9162,654 9158,38 9152,12	$\begin{array}{c} 2 \\ 100 \\ 500 \\ 2 \\ 20 \end{array}$	$ \begin{array}{c} 10,40 \\ 9,69 \\ 8,44 \\ \hline 9,92 \end{array} $	11,75 11,04 9,79 — 11,27	$\begin{array}{c} 5d \left[1^{1}/_{2} \right]^{\circ} - 6f \left[2^{1}/_{2} \right] \\ 6p \left[2^{1}/_{2} \right] - 6d \left[3^{1}/_{2} \right]^{\circ} \\ 6s \left[1^{1}/_{2} \right]^{\circ} - 6p \left[1^{1}/_{2} \right] \\ - \\ 5d \left[1^{1}/_{2} \right]^{\circ} - 4f \left[2^{1}/_{2} \right] \end{array}$	$ \begin{array}{r} 1-2 \\ 2-3 \\ 1-1 \\ - \\ 1-2 \end{array} $
9141,8 9131,59 9112,24 9096,13 9045,446	$\begin{array}{c} 2\\ 3\\ 4\\ 50\\ 400 \end{array}$	10,22 10,22 10,22 10,22 40,22 8,31	11,58 11,58 11,58 11,58 9,69	$\begin{array}{c} 5d \left[2^{1}/_{2} \right]^{\circ} - 5f \left[1^{1}/_{2} \right] \\ 5d \left[2^{1}/_{2} \right]^{\circ} - 5f \left[4^{1}/_{2} \right] \\ 5d \left[2^{1}/_{2} \right]^{\circ} - 5f \left[2^{1}/_{2} \right] \\ 5d \left[2^{1}/_{2} \right]^{\circ} - 5f \left[3^{1}/_{2} \right] \\ 6s \left[1^{1}/_{2} \right]^{\circ} - 6p \left[2^{1}/_{2} \right] \end{array}$	3-2 3-4 3-3 3-3, 4 2-2
9032,18 9025,98 8987,57 8981,05 8952,78	50 30 200 100 50	9,89 9,79 9,69 9,72 9,57	11,26 11,16 11,06 11,10 10,95	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 $1-1$ $2-2$ $3-3$ $1-2$
8952,254 8930,83 8908,73 8885,71 8862,32	1000 200 200 40 300	8,44 9,57 9,58 10,04 9,58	9,82 10,96 10,97 11,43 10,98	$\begin{array}{c} 6s \left[1^{1}/_{2} \right]^{\circ} - 6p \left[1^{1}/_{2} \right] \\ 6s' \left[1^{1}/_{2} \right]^{\circ} - 6p' \left[1^{1}/_{2} \right] \\ 6p \left[1^{1}/_{2} \right] - 6d \left[1^{1}/_{2} \right]^{\circ} \\ 5d \left[3^{1}/_{2} \right]^{\circ} - 8p \left[2^{1}/_{2} \right] \\ 6p \left[1^{1}/_{2} \right] - 6d \left[1^{1}/_{2} \right]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-0 \\ 3-2 \\ 1-1 \end{array} $
8851,44 8819,412	$\begin{array}{c} 1 \\ 5000 \end{array}$	10,04 8,31	$\substack{11,44\\9,72}$	$5d [3^{1}/_{2}]^{\circ} -8p [2^{1}/_{2}]$ $6s [4^{1}/_{2}]^{\circ} -6p [2^{1}/_{2}]$	$\begin{array}{c} 3-3 \\ 2-3 \end{array}$

λ, Å	I	$E_{ m H},~{ m eV}$	E _B , eV	Transition	J
8758,20 8739,39 8711,54	100 300 2	9,69 9,58 10,16	11,10 11,00 11,58	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 6d \ [4^{1}/_{2}]^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \end{array}$	2—3 1—2 2—3
8709,64 8696,86 8692,20 8648,54 8624,24	40 200 100 250 80	10,16 10,16 9,57 9,57 9,82	11,58 11,58 10,99 11,00 11,26	$\begin{array}{c} 5d \ [2^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [4^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 6p \ [4^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-2 2-3 1-2 1-1 2-2
8576,01 8564,7 8553,97 8530,10 8522,55	200 1 2 30 30	9,57 10,40 10,40 9,82 9,45	11,01 11,85 11,85 11,27 10,90	$\begin{array}{c} 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7f \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7f \ [^{2}/_{2}] \\ 6p \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \end{array}$	1-0 1-2 1-2 2-1 0-1
8450,37 8437,55 8409,190 8402,03 8392,37	$\begin{array}{c} 1 \\ 10 \\ 2000 \\ 5 \\ 20 \end{array}$	9,96 9,79 8,31 9,96 9,69	11,42 11,26 9,79 11,43 11,16	$\begin{array}{c} 5d \ \{1^{1}/_{2}\}^{\circ}-8p \ [^{1}/_{2}]\\ 6p \ \{1^{1}/_{2}\}-8s \ [^{1}/_{2}]^{\circ}\\ 6s \ \{1^{1}/_{2}\}^{\circ}-6p \ [^{1}/_{2}]\\ 5d \ [^{1}/_{2}]^{\circ}-8p \ [^{2}/_{2}]\\ 6p \ [^{2}/_{2}]-6d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 1-2 \\ 2-1 \\ 2-1 \\ 2-1 \end{array} $
8372,79 8371,38 8349,05 8347,45 8346,823	$ \begin{array}{r} 5 \\ 3 \\ 40 \\ 60 \\ 2000 \end{array} $	9,82 9,96 9,58 9,79 9,57	11,30 11,44 11,06 11,27 11,05	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 5d \ [4^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [4^{1}/_{2}] - 8s \ [4^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [4^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 4-2 \\ 1-1 \\ 1-2 \end{array} $
8324,58 8323,90 8297,71 8280,1163 8266,519	$\begin{array}{c} 20 \\ 2 \\ 15 \\ 7000 \\ 500 \end{array}$	9,93 9,96 9,96 8,44 9,97	11,42 11,45 11,45 9,93 11,07	$\begin{array}{c} 6p \ [^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 6s \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \end{array}$	0-1 $2-1$ $2-2$ $1-0$ $1-1$
8231,6348 8206,341 8196,73 8182,93 8171,02	10000 700 2 1 100	$\begin{array}{c} 8,31 \\ 9,45 \\ 9,79 \\ 10,40 \\ \left\{ \begin{array}{c} 9,82 \\ 9,92 \end{array} \right. \end{array}$	9,82 10,96 11,30 11,92 11,34 11,43	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 5d \ [1^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \end{array}$	2-2 0-1 1-2 1-2 2-2 1-2
8165,37 8123,29 8118,29 8109,46 8107,91	2 2 15 15 6	10,22 10,22 10,22 10,22 10,22		$\begin{array}{c} - \\ 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	 32 34 33 32
8101,98 8097,24 8073,99 8064,94 8061,340	100 3 1 2 150	10,22 9,92 9,89 10,04 9,72	11,75 11,45 11,42 11,58 11,26	$\begin{array}{c} 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [4^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \end{array}$	3-3, 4 1-1 0-1 3-2 3-2
8057,258 8042,18 8040,56 8029,67 8003,26	200 15 10 100 10	10,04 10,04 10,04 10,04 9,79	11,58 11,58 11,58 11,58 11,34	$\begin{array}{c} 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \end{array}$	3-4 3-3 3-2 3-3, 4 1-2
7976,03 7967,341 7954,22 7937,41 7887,395 7881,320	8 500 4 40 300 100	9,82 9,45 9,92 9,93 9,57 9,69	11,37 11,00 11,47 11,49 11,14 11,26	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 5d' \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-3 0-1 1-0 0-1 1-0 2-2
7881,320 7841,23 7832,98 7802,651 7790,53	15 10 100 1	9,72 9,58 9,69 10,16	11,26 11,30 11,16 11,27 11,75	$\begin{array}{c} 6p \left[2^{1}/_{2} \right] - 3s \left[1^{1}/_{2} \right] \circ \\ 6p \left[2^{1}/_{2} \right] - 5d' \left[2^{1}/_{2} \right] \circ \\ 6p \left[1^{1}/_{2} \right] - 6d \left[1^{1}/_{2} \right] \circ \\ 6p \left[2^{1}/_{2} \right] - 8s \left[1^{1}/_{2} \right] \circ \\ 5d \left[2^{1}/_{2} \right] \circ - 6f \left[2^{1}/_{2} \right] \end{array}$	3-2 1-1 2-1 2-3

λ, Λ	I	E _{II} , eV	E _B , eV	Transition	J
7789,42	15	10,16	11,75	$5d [2^{1}/_{2}]^{\circ}-6f [2^{1}/_{2}]$ $5d [2^{1}/_{2}]^{\circ}-6f [3^{1}/_{2}]$ $6p [4^{1}/_{2}]-7d [^{1}/_{2}]^{\circ}$ $6p [2^{1}/_{2}]-5d' [2^{1}/_{2}]^{\circ}$ $5d [4^{1}/_{2}]^{\circ}-5f [4^{1}/_{2}]$	2-2
7783,66	50	10,16	11,75		2-3
7740,31	40	9,82	11,42		2-1
7670,81	1	9,69	11,30		2-2
7666,61	10	9,96	11,57		2-1
7664,56	30	9,96	11,58	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 5d' \ [4^{1}/_{2}]^{\circ} \\ 5d \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \end{array}$	2-2
7664,02	40	9,72	11,34		3-2
7643,91	400	9,96	11,58		2-3
7642,30	—	9,96	11,58		2-2
7642,025	500	9,45	11,58		0-1
7609,82	3	10,22	11,85	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-4
7608,46	5	10,04	11,67		3-2
7604,97	2	10,22	11,85		3-3
7600,77	10	10,22	11,85		3-3, 4
7594,36	1	10,04	11,67		3-3
7589,61	6	9,79	11,42	$\begin{array}{c} 6p \ [4^{1}/_{2}] - 7d \ [^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [4^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 5f \ [3^{1}/_{2}] \end{array}$	1-1
7584,680	200	9,94	11,58		4-5
7584,29	10	9,94	11,58		4-4
7570,93	6	9,94	11,98		4-3
7559,79	40	9,94	11,58		4-3, 4
7514,96 7514,54 7501,13. 7492,23 7474,01	$\begin{array}{c} 3 \\ 8 \\ 20 \\ 20 \\ 25 \end{array}$	9,93 9,79 9,69 9,72 9,92	11,58 11,44 11,34 11,37 11,57	$\begin{array}{c} 6p \ [1/_2] - 9s \ [1/_2]^{\circ} \\ 6p \ [1/_2] - 7d \ [1/_2]^{\circ} \\ 6p \ [2^1/_2] - 5d' \ [1/_2]^{\circ} \\ 6p \ [2^1/_2] - 5d' \ [2^1/_2]^{\circ} \\ 5d \ [1/_2]^{\circ} - 5f \ [1^1/_2] \end{array}$	0-1 1-0 2-2 3-3 1-1
7472,01	40	9,92	11,58	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 5f \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 5f \ [^{2}/_{2}] \\ 6p \ [^{1}/_{2}] - 7d \ [^{3}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 7d \ [^{2}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 5d' \ [^{1}/_{2}]^{\circ} \end{array}$	1-2
7451,00	25	9,92	11,58		1-2
7441,94	20	9,82	11,49		2-3
7424,05	20	9,82	11,49		2-2
7405,77	3	9,93	11,61		0-1
7404,51	12	9,82	11,49	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [1/_{2}] - 8s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [1/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \end{array}$	2-1
7400,41	30	9,82	11,50		2-2
7393,793	150	9,82	11,50		2-3
7386,002	100	9,58	11,26		1-2
7355,58	40	9,89	11,57		0-1
7336,480	50	9,69	11,37	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 5a' \ [2^{1}/_{2}]^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 7f \ [3^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 8s \ [^{1}/_{2}]^{\circ} \end{array}$	2-3
7323,05	2	10,16	11,85		2-2
7312,452	80	9,57	11,26		1-1
7319,94	15	10,16	11,85		2-3
7316,87	20	9,58	11,27		1-1
7316,272 7313,01 7307,37 7285,301 7283,961	70 1 5 60 40	9,57 $10,22$ $10,22$ $9,79$ $9,57$	11,26 11,91 11,92 11,49 11,27	$\begin{array}{c} 6s' \ [^{1}/_{2}]^{\circ} - 4f \ [^{1}/_{2}] \\ 5d \ [^{2^{1}}/_{2}]^{\circ} - 8f \ [^{4^{1}}/_{2}] \\ 5d \ [^{2^{1}}/_{2}]^{\circ} - 8f \ [^{3^{1}}/_{2}] \\ 6p \ [^{1^{1}}/_{2}] - 7d \ [^{2^{1}}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 4f \ [^{2^{1}}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 3-4 \\ 3-3, 4 \\ 1-2 \\ 1-2 \end{array} $
7266,49 7262,54 7257,94 7250,87 7249,92	25 20 60 5 2	$9,79 \\ 9,79 \\ 10,04 \\ 10,04 \\ 9,96 \\ 10,04$	11,49 11,50 11,75 11,75 11,67 11,75	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ} - 6f \ [3^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	1-1 1-2 3-4 3-3 2-2 3-2
7244,94	20	10,04	11,75	$\begin{array}{c} 5d \ [3^{1}/2] \circ -6f \ [3^{1}/2] \\ 5d \ [4^{1}/2] \circ -9p \ [2^{1}/2] \\ 5d \ [4^{1}/2] \circ -9p \ [4^{1}/2] \\ 5d \ [4^{1}/2] \circ -9p \ [4^{1}/2] \\ 6p \ [1^{1}/2] -5d' \ [2^{1}/2] \circ \end{array}$	3-3, 4
7238,20	3	9,96	11,67		2-3
7220,24	1	9,96	11,67		2-1
7209,14	5	9,96	11,68		2-2
7200,79	45	9,58	11,30		1-2
7172,70	10	9,94	11,67	$5d [3^{1}/_{2}]^{\circ} - 9p [2^{1}/_{2}]$	$\begin{array}{c} 4-3 \\ 2-1 \end{array}$
7136,57	15	9,69	11,42	$6p [2^{1}/_{2}] - 7d [1/_{2}]^{\circ}$	

λ, Α	I	E _H , eV	EB, eV	Transition	J
7119,598 7078,46 7051,06	500 1 3	9,72 9,92 9,58	11 ,46 11 ,67 11 ,34	$6p [2^{1}/_{2}]$ — $7d [3^{1}/_{2}]^{\circ}$ $5d [^{1}/_{2}]^{\circ}$ — $9p [2^{1}/_{2}]$ $6p [^{1}/_{2}]$ — $5d' [1^{1}/_{2}]^{\circ}$	$ \begin{array}{c} 3-4 \\ 1-2 \\ 1-2 \end{array} $
7049,36 7049,07 7047,37 7035,53 7034,80	$\begin{array}{c} 1 \\ 1 \\ 30 \\ 20 \\ 3 \end{array}$	10,16 9,92 9,82 9,82 —	11,92 11,67 11,58 11,58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 2-2 \\ 2-1 \\ \end{array} $
7019,02 7003,10 6991,65 6982,05 6976,182	30 4 1 30 100	9,72 9,72 9,92 9,72 9,72	11,49 11,49 11,69 11,50 11,50	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 7d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-3 \\ 3-2 \\ 1-0 \\ 3-2 \\ 3-3 \end{array} $
6936,69 6935,62 6925,53 6924,67 6922,22	8 50 100 15 8	9,96 9,96 9,96 9,96 9,79	11 ,74 11 ,74 11 ,75 11 ,75 11 ,58	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ}-6f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ}-6f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ}-6f \ [2^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ}-6f \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}]-9s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 2-1 \\ 2-3 \\ 2-2 \\ 1-2 \end{array} $
6910,82 6882,155 6872,107 6866,838 6865,58	30 300 100 50 5	9,79 9,69 9,94 9,69 9,94	11,58 11,49 11,75 11,49 11,75	$\begin{array}{c} 6p \ [4^{1}/_{2}] - 9s \ [4^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 7d \ [3^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 4 - 5 \\ 2 - 2 \\ 4 - 3 \end{array} $
6863,20 6860,19 6850,13 6848,82 6846,613	20 40 30 50 60	9,93 9,94 9,69 10,04 9,69	11 ,74 11 ,75 11 ,49 11 ,85 11 ,50	$\begin{array}{c} 6p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{31}/_{2}]^{\circ} - 6f \ [^{31}/_{2}] \\ 6p \ [^{21}/_{2}] - 7d \ [^{11}/_{2}]^{\circ} \\ 5d \ [^{31}/_{2}]^{\circ} - 7f \ [^{41}/_{2}] \\ 6p \ [^{21}/_{2}] - 7d \ [^{11}/_{2}]^{\circ} \end{array}$	0—1 4—3, 4 2—1 3—4 2—2
6844,84 6844,27 6841,50 6840,96 6827,315	$\begin{array}{c} 2\\ 1\\ 20\\ 8\\ 200 \end{array}$	10,04 10,04 10,04 9,69 9,45	11,85 11,85 11,85 11,50 11,26	$\begin{array}{c} 5d \ [3^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 7f \ [3^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 7d \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 4f \ [1^{1}/_{2}] \end{array}$	3-3 3-2 3-3, 4 2-3 0-1
6818,38 6815,64 6778,60 6777,57 6767,12	15 12 40 50 10	9,79 9,93 9,92 9,92 9,92	11,61 11,75 11,74 11,75 11,75	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 10s \ [4^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6f \ [4^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 1 - 1 \\ 1 - 2 \\ 1 - 2 \end{array} $
6728,008 6706,46 6681,036 6678,972 6668,920	200 1 20 25 150	{ 9,96 9,58 9,96 9,89 9,57 9,58	11,80 11,42 11,81 11,74 11,42 11,44	$\begin{array}{c} 5d \left[1^{1}/_{2}\right]^{\circ} - 10p \left[2^{1}/_{2}\right] \\ 6p \left[1^{1}/_{2}\right] - 7d \left[1^{1}/_{2}\right]^{\circ} \\ 5d \left[1^{1}/_{2}\right]^{\circ} - 10p \left[1^{1}/_{2}\right] \\ 5d \left[1^{1}/_{2}\right]^{\circ} - 6f \left[1^{1}/_{2}\right] \\ 6s' \left[1^{1}/_{2}\right]^{\circ} - 8p \left[1^{1}/_{2}\right] \\ 6p \left[1^{1}/_{2}\right] - 7d \left[1^{1}/_{2}\right]^{\circ} \end{array}$	2-2 1-1 2-2 0-1 1-1 1-0
6666,965 6664,85 6657,92 6648,75 6632,464	60 4 20 3 50	9,72 — 9,82 9,57 9,82	11,58 — 11,68 11,43 11,69	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 3-2 \\ -1 \\ 1-2 \\ 2-2 \\ \end{array} $
6630,44 6608,87 6607,41 6602,87 6595,561	2 10 30 4 100	9,82 9,82 10,04 10,04 9,82	11,69 11,70 11,91 11,92 11,70	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-3 2-2 3-4 3-3, 4 2-3 1-0
6590,86 6583,27 6560,65 6559,97 6554,196	8 20 4 25 50	9,79 9,57 9,96 9,96 9,96	11 ,67 11 ,45 11 ,85 11 ,85 11 ,85	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 5d \ [4^{1}/_{2}]^{\circ} - 7f \ [4^{1}/_{2}] \\ 5d \ [4^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \end{array}$	1-0 1-2 2-2 2-2 2-3

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
6553,66 6546,12 6543,360 6533,159 6521,508	$\begin{array}{c} 4 \\ 20 \\ 40 \\ 100 \\ 40 \end{array}$	9,96 9,79 9,69 9,69 9,79	11,85 11,68 11,58 11,58 11,58	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 1-1 \\ 2-2 \\ 2-1 \\ 1-2 \end{array} $
6507,50 6504,18 6500,37 6498,718 6497,43	3 200 45 400 30	8,31 { 9,57 9,94 9,93 9,79 9,94	10,22 11,47 11,85 11,84 11,70 11,85	$\begin{array}{c} 6s \left[1^{1}/_{2}\right]^{\circ} - 5d \left[2^{1}/_{2}\right]^{\circ} \\ 6s' \left[1^{1}/_{2}\right]^{\circ} - 8p \left[1^{1}/_{2}\right] \\ 5d \left[3^{1}/_{2}\right]^{\circ} - 7f \left[4^{1}/_{2}\right] \\ 6p \left[1^{1}/_{2}\right] - 9d \left[1^{1}/_{2}\right]^{\circ} \\ 6p \left[1^{1}/_{2}\right] - 8d \left[2^{1}/_{2}\right]^{\circ} \\ 5d \left[3^{1}/_{2}\right]^{\circ} - 7f \left[3^{1}/_{2}\right] \end{array}$	2-3 1-0 4-5, 4 0-1 1-2 4-3, 4
6487,765 6472,841 6469,705 6461,50 6451,79	120 150 300 3 10	9,58 9,58 9,58 9,93 10,04	11,49 11,49 11,50 11,85 11,96	$\begin{array}{c} 6p \ [^{1}/_{2}] - 7d \ [^{21}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 7d \ [^{11}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 7d \ [^{11}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 11s \ [^{11}/_{2}]^{\circ} \\ 5d \ [^{31}/_{2}]^{\circ} - 9f \ [^{41}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 0-1 \\ 3-4 \end{array} $
6450,48 6448,70 6430,155 6418,98 6418,41	7 2 20 30 30	$\begin{array}{c} 9,69 \\ 10,04 \\ 9,82 \\ \{ \begin{array}{c} 9,92 \\ 9,82 \\ 9,92 \end{array} \end{array}$	11,61 11,96 11,75 11,85 11,75 11,85	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 9f \ [3^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \end{array}$	2-3 3-3, 4 2-2 1-1 1-1 1-2
6412,38 6355,77 6344,98 6337,58 6333,97	10 20 2 8 40	9,92 9,79 10,04 9,96 9,96	11,85 11,74 11,99 11,91 11,92	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 10f \ [4^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 8f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-1 \\ 3-4 \\ 2-2 \\ 2-3 \end{array} $
6331,50 6325,81 6318,062 6314,97 6294,45	20 2 500 15 15	9,89 9,79 9,72 9,79 9,72	11,85 11,75 11,68 11,75 11,69	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \end{array}$	0-1 1-2 3-4 1-1 3-2
6292,649 6286,011 6284,38 6281,81 6276,99	50 100 2 5 4	9,72 9,94 9,94 9,94 9,93	11,69 11,91 11,92 11,92 11,91	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 8f \ [4^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 8f \ [3^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \end{array}$	3—3 4—5 4—3 4—3 0—1
6273 ,23 6268 ,34 6265 ,301 6261 ,212 6242 ,09	10 1 40 50 8	9,72 10,04 9,45 9,72 9,82	11,70 12,02 11,42 11,70 11,81	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 11f \ [4^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \end{array}$	3-2 3-4 0-1 3-3 2-1
6224,169 6220,84 6209,11 6206,297 6205,75	40 1 3 20 4	9,82 9,82 9,82 9,69 9,92	11,81 11,81 11,82 11,68 11,91	$\begin{array}{l} 6p \ [4^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [4^{1}/_{2}] - 9d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [4^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 8f \ [4^{1}/_{2}] \end{array}$	2-2 2-3 2-2 2-1 1-1
6205,35 6201,49 6200,890 6198,260 6195,49	6 3 60 100 1	9,92 9,92 9,82 9,58 9,45	11,91 11,92 11,82 11,58 11,45	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 2-3 \\ 1-2 \\ 0-1 \end{array} $
6193,89 6191,40 6189,40 6184,16 6182,420	1 4 20 3 300	9,96 9,96 9,58 9,69 9,69	11,96 11,96 11,58 11,69 11,69	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ} - 9f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 9f \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 9s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 8d \ [3^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 1-1 \\ 2-2 \\ 2-3 \end{array} $
6179,665 6178,302 576	120 150	$\substack{9,57\\9,57}$	11,57 11,58	$6s' [1/2]^{\circ} -5f [11/2]$ $6s' [1/2]^{\circ} -5f [11/2]$	$ \begin{array}{c} 1 - 1 \\ 1 - 2 \end{array} $

λ, Å	I	E _H , eV	E _B , eV	Transition	J
6163,935 6163,660 6162,16	80 90 3	9,57 9,69 9,79	11,58 11,70 11,80	$6s' [1/2]^{\circ} - 5f [2^{1}/2]$ $6p [2^{1}/2] - 8d [2^{1}/2]^{\circ}$ $6p [1^{1}/2] - 9d [1/2]^{\circ}$	1-2 2-2 1-0
6152,069 6144,97 6143,70 6142,13 6131,47	20 20 4 1 1	9,69 9,94 9,79 9,94 9,93	11,70 11,96 11,81 11,96 11,96	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 9f \ [4^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 5d \ [3^{1}/_{2}]^{\circ} - 9f \ [3^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 11d \ [1^{1}/_{2}]^{\circ} \end{array}$	2—3 4—5, 4 1—1 4—3, 4 0—1
6126,36 6123,91 6114,86 6111,951 6111,759	15 5 10 40 30	9,79 9,89 9,58 9,72 9,79	11,81 11,91 11,61 11,75 11,82	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 8f \ [1^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 5d' \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 0-1 \\ 1-1 \\ 3-2 \\ 1-2 \end{array} $
6108,37 6103,88 6095,15 6093,38 6067,77	8 3 1 3 1	9,82 9,82 9,96 9,96 9,92	11,85 11,85 11,99 11,99 11,96	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [1^{1}/_{2}]^{\circ} - 10f \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 10f \ [2^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 9f \ [1^{1}/_{2}] \end{array}$	2-2 2-1 2-1, 2 2-3 1-1
6067,52 6064,91 6048,00 6043,38 6034,92	2 1 6 10 2	9,92 9,92 9,94 9,79 9,69	11,96 11,96 11,99 11,84 11,74	$\begin{array}{c} 5d \ [^{1}/_{2}]^{\circ} - 9f \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 9f \ [^{2}/_{2}] \\ 5d \ [^{3}/_{2}]^{\circ} - 10f \ [^{4}/_{2}] \\ 6p \ [^{1}/_{2}] - 9d \ [^{4}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 8d \ [^{4}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 4-5, 4 \\ 1-1 \\ 2-1 \end{array} $
6031,36 6026,76 6022,89 6014,10 6009,78	1 4 1 1 8	9,93 9,82 9,96 9,79 9,79	11,99 11,89 12,02 11,85 11,85	$\begin{array}{c} 6p \ [^{1}/_{2}] - 12d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 11f \ [^{2}1/_{2}] \\ 6p \ [^{1}/_{2}] - 11s \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 11s \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 $2-1$ $2-3$ $1-2$ $1-1$
6007,909 5998,415 5989,48 5986,23 5979,42	15 30 20 4 1	9,69 9,69 9,82 9,82 9,82	11,75 11,75 11,89 11,89 11,89	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 2-1 \\ 2-2 \\ 2-1 \\ 2-2 \end{array} $
5978 ,29 5974 ,152 5972 ,82 5970 ,41 5934 ,172	2 40 1 1 100	9,94 9,82 9,92 9,92 9,72	12,02 11,90 11,99 11,99 11,81	$\begin{array}{c} 5d \ [3^{1}/_{2}]^{\circ}11f \ [4^{1}/_{2}] \\ 6p \ [1^{1}/_{2}]10d \ [2^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ}10f \ [1^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ}10f \ [2^{1}/_{2}] \\ 6p \ [2^{1}/_{2}]9d \ [3^{1}/_{2}]^{\circ} \end{array}$	4-5, 4 2-3 1-1, 2 1-2 3-4
5931,241 5925,56 5922,550 5921,85 5916,65	80 6 20 10 4	9,58 9,72 9,72 9,57 9,82	11,67 11,81 11,81 11,66 11,92	$\begin{array}{c} 6p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2^{1}}/_{2}] - 9d \ [^{1^{1}}/_{2}]^{\circ} \\ 6p \ [^{2^{1}}/_{2}] - 9d \ [^{3^{1}}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \\ 6p \ [^{1^{1}}/_{2}] - 12s \ [^{1^{1}}/_{2}]^{\circ} \end{array}$	1-0 3-2 3-3 1-1 2-2
5911,90 5906,76 5904,462 5898,56 5895,62	5 3 20 8 2	9,72 9,57 9,72 9,79 9,79	11,82 11,67 11,82 11,89 11,89	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 3-2 \\ 1-2 \\ 3-3 \\ 1-2 \\ 1-1 \end{array} $
5894,988 5889,12 5878,92 5875,018 5856,509	20 6 100	9,58 9,79 9,57 9,58 9,58	11,68 11,89 11,68 11,69 11,70	$\begin{array}{c} 6p \ [^{1}/_{2}] - 8d \ [^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 8d \ [2^{1}/_{2}]^{\circ} \end{array}$	1-1 1-2 1-2 1-2 1-2
5849 ,85 5846 ,21 5845 ,46 5843 ,43 5840 ,83	3 2 1 5 4	9,79 9,57 9,82 9,69 9,82	11,91 11,69 11,94 11,81 11,94	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 11d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2^{1}/_{2}}] - 9d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1^{1}/_{2}}] - 11d \ [^{1^{1}/_{2}}]^{\circ} \end{array}$	1-1 1-0 2-1 2-1 2-2

λ, ἄ	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
5830,63 5827,72 5824,800 5823,890 5820,52	$\begin{array}{c} 20 \\ 1 \\ 150 \\ 300 \\ 25 \end{array}$	9,82 9,69 9,69 9,45 9,72	11,95 11,81 11,81 11,57 11,85	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 9d \ [3^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \end{array}$	2-3 2-2 2-3 0-1 3-2
5814,505 5807,311 5792,26 5754,60 5748,20	60 15 1 1 8	9,69 9,69 9,82 9,79 9,79	11,82 11,82 11,96 11,94 11,95	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 13s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 11d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{r} 2-2 \\ 2-3 \\ 2-2 \\ 1-2 \\ 1-2 \end{array} $
5740,73 5740,47 5733,48 5726,40 5723,26	1 6 4 4 1	9,82 9,58 9,82 9,69 9,79	11,98 11,74 11,98 11,85 11,96	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 12d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 8d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 12d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 11d \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 2-3 \\ 2-2 \\ 1-1 \end{array} $
5722,14 5716,252 5715,716 5712,21 5709,80	15 80 70 2 10	9,69 9,72 9,58 9,72 9,72	11,85 11,89 11,75 11,89 11,89	$\begin{array}{l} 6p \ [2^{1}/_{2}] - 11s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [1^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [3^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 3-4 \\ 1-2 \\ 3-2 \\ 3-3 \end{array} $
5706,87 5703,34 5698,54 5696,479 5695,750	3 1 8 80 100	9,58 9,72 9,72 9,57 9,57	11 ,75 11 ,89 11 ,90 11 ,74 11 ,75	$\begin{array}{c} 6p \ [^{1}/_{2}] - 10s \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 10d \ [^{2}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 10d \ [^{2}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 6f \ [^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 6f \ [^{1}/_{2}] \end{array}$	1-1 3-2 3-3 1-1 1-2
5688 ,373 5664 ,46 5654 ,31 5652 ,84 5646 ,19	40 1 1 2 5	9,57 9,82 9,69 9,79 9,72	11,75 12,01 11,88 11,98 11,92	$\begin{array}{c} 6s' \ [^{1}/_{2}\]^{\circ} - 6f \ [^{21}/_{2}\] \\ 6p \ [^{11}/_{2}\] - 13d \ [^{31}/_{2}\]^{\circ} \\ 6p \ [^{21}/_{2}\] - 7s' \ [^{1}/_{2}\]^{\circ} \\ 6p \ [^{11}/_{2}\] - 12d \ [^{21}/_{2}\]^{\circ} \\ 6p \ [^{21}/_{2}\] - 12s \ [^{11}/_{2}\]^{\circ} \end{array}$	1-2 $2-3$ $2-1$ $1-2$ $3-2$
5621,24 5618,878 5612,65 5607,99 5594,37	1 80 15 3 6	9,69 9,69 9,69 9,69 9,45	11,89 11,89 11,89 11,90 11,66	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 9p \ [^{1}/_{2}] \end{array}$	2-2 2-3 2-2 2-3 0-1
5585 ,18 5581 ,784 5579 ,28 5575 ,27 5567 ,77	1 50 40 2 2	9,79 9,58 9,72 9,72 9,72	12,01 11,80 11,94 11,94 11,95	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 13d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 11d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 11d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 11d \ [2^{1}/_{2}]^{\circ} \end{array}$	1-2 1-0 3-4 3-3 3-3
5566,645 5566,22 5563,50 5557,28 5555,06	100 5 2 2 1	9,58 9,57 9,69 9,57	11,81 11,80 11,92 11,80	$\begin{array}{c} 6p \ [^{1}/_{2}] - 9d \ [^{1}/_{2}]^{\circ} \\ - \\ 6s' \ [^{1}/_{2}]^{\circ} - 10p \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 10p \ [2^{1}/_{2}] \end{array}$	1—1 — 1—1 2—2 1—2
5553,40 5552,385 5540,38 5532,78	2	$9,69 \\ 9,58 \\ 9,58 \\ 9,57 \\ 9,72 \\ 9,72$	11,92 11,81 11,82 11,81 11,96	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 12s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 9d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 9d \ [2^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 10p \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 13s \ [1^{1}/_{2}]^{\circ} \end{array}$	$ \begin{array}{c} 2-1 \\ 1-2 \\ 1-2 \\ 1-2 \\ 3-2 \end{array} $
5523,05 5488,555 5487,03 5484,46 5484,16 5481,33	3 20 6 4 1	9,57 9,69 9,72 9,69 9,72	11,81 11,94 11,98 11,95 11,98	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 2-3 3-4 2-2 3-3
5479,12 5460,037	1 1 15	9,69 9,72 9,58	11,95 11,98 11,85	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2 - 3 \\ 3 - 3 \\ 1 - 2 \end{array} $

	 .	1			
λ, Å	I	$E_{\rm H}$, eV	E _B , eV	Transition	J
5456 ,45 5454 ,54 5444 ,87	2 1 1	9,58 9,72 9,69	11,85 11,99 11,96	$6p \ [^{1}/_{2}]$ —11s $[1^{1}/_{2}]^{\circ}$ $6p \ [2^{1}/_{2}]$ —14s $[1^{1}/_{2}]^{\circ}$ $6p \ [2^{1}/_{2}]$ —13s $[1^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 3 - 2 \\ 2 - 1 \end{array} $
5440,39 5439,923 5435,60 5421,76 5418,02	15 30 5 2 5	9,57 9,57 9,57 9,72	11,85 11,85 11,85 12,01	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 1—2 1—2 3—4
5400,45 5397,63 5394,738 5392,795 5373,74	4 1 20 100 1	$ \begin{array}{c} 9,69 \\ 9,72 \\ 9,69 \\ 9,58 \\ 9,45 \\ 9,72 \end{array} $	11,98 12,02 11,98 11,89 11,74 12,03	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 12d \ [3^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 15s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 12d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 6f \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 14d \ [3^{1}/_{2}]^{\circ} \end{array}$	2-3 3-2 2-2 1-0 0-1 3-4
5367,03 5364,626 5362,244 5356,80 5337,89	6 30 15 1 2	9,58 9,58 9,58 9,58 9,69	11,89 11,89 11,89 12,01	$\begin{array}{c} - \\ 6p \ [^{1}/_{2}] - 10d \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 10d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 10d \ [2^{1}/_{2}]^{\circ} \\ 6p \ [2^{1}/_{2}] - 13d \ [3^{1}/_{2}]^{\circ} \end{array}$	 12 11 12 23
5335,91 5306,37 5286,38 5286,11 5283,30	1 3 3 4 2	9,69 9,58 9,57 9,57 9,57	12,01 11,92 11,91 11,91 11,92	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 1—2 1—1 1—2 1—2
5273,48 5251,89 5248,98 5245,27 5206,07	1 2 4 4 1	9,45 — 9,58 9,58 9,58	11,80 — 11,94 11,94 11,96	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 - 1-1 1-2 1-2
5185,85 5167,30 5164,39 5162,711 5116,46	2 1 1 10 2	9,57 9,58 9,58 9,45 9,57	11,96 11,98 11,98 11,85 11,99	$\begin{array}{c} 6s' \ [^{1}/_{2}]^{\circ} - 9f \ [^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 12d \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] - 12d \ [^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 7f \ [^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 10f \ [^{1}/_{2}] \end{array}$	$ \begin{array}{ccc} 1-1, & 2 \\ 1-1 \\ 1-2 \\ 0-1 \\ 1-2, & 1 \end{array} $
5028,2796 5023,88 4923,1522 4916,508 4843,294	3	8,44 9,45 8,44 8,44	10,90 11,91 10,95 10,96 10,99	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 1 - 2 \\ 1 - 1 \\ 1 - 2 \end{array} $
4829,709 4807,019 4792,6192 4734,1524 4708,21		8,44 8,44 8,31 8,44 8,44	11,00 11,01 10,90 11,05 11,07	$\begin{array}{c} 6s \ [4^{1}/_{2}]^{\circ} -7p \ [4^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} -7p \ [^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} -7p \ [4^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} -6p' \ [4^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} -6p' \ [^{1}/_{2}] \end{array}$	1-1 1-0 2-1 1-2 1-1
4697,020 4690,9711 4671,226 4624,2757 4611,8896	2000 1000	8,31 8,31 8,31 8,31 8,31	10,95 10,96 10,97 10,99 11,00	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} -7p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} -6p' \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} -7p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} -7p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} -7p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 2-1 \\ 2-3 \\ 2-2 \\ 2-1 \end{array} $
4582,7474 4576,60 4524,6805 4500,9772 4385,7693 4383,9092 4372,287 4205,404	2 400 500 70 4 100 20 10	8,44 8,31 8,31 8,31 8,44 8,44 8,44 8,31	11,14 11,02 11,05 11,07 11,26 11,26 11,27 11,26	6s $[1^{1}/_{2}]^{\circ}$ —6p' $[1/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —6d $[3^{1}/_{2}]^{\circ}$ 6s $[1^{1}/_{2}]^{\circ}$ —6p' $[1^{1}/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —6p' $[1^{1}/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —4f $[1^{1}/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —4f $[2^{1}/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —4f $[2^{1}/_{2}]$ 6s $[1^{1}/_{2}]^{\circ}$ —4f $[1^{1}/_{2}]$	1-0 2-4 2-2 2-1 1-1 1-2 1-2 2-1
4203,6945 4193,5296		8,31 8,34	11,26 $11,27$	$6s [1^{1}/_{2}]^{c} - 4f [1^{1}/_{2}]$ $6s [1^{1}/_{2}]^{c} - 4f [2^{1}/_{2}]$	2—2 2—3

λ, Å	I	E _H , eV	E _B , eV	Transition	J
4193,01 4146,78 4135,1337 4116,1151 4109,7093	20 2 20 80 60	8,31 8,44 8,44 8,44 8,44	11,27 11,42 11,43 11,45 11,45	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ}-4f \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ}-8p \ [1/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ}-8p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ}-8p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ}-8p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 1-2 \\ 1-1 \\ 1-2 \end{array} $
4078,8207 3985,202 3974,417 3967,541 3956,85	100 30 40 200 6	8,44 8,31 8,31 8,31 8,31	11,47 11,42 11,43 11,44 11,45	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 2 - 2 \\ 2 - 3 \\ 2 - 1 \end{array} $
3950,925 3948,72 3948,163 3942,29 3835,6	120 10 60 2 2	8,31 8,44 8,44 8,44 8,44	11,45 11,57 11,58 11,58 11,67	$\begin{array}{l} 6s \ [1^{1}/_{2}]^{\circ} - 8p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 5f \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-2 \\ 1-1 \\ 1-2 \\ 1-2 \\ 1-2 \end{array} $
3826,86 3823,74 3809,84 3801,90 3801,39	15 10 30 3 3	8,44 8,44 8,44 8,31 8,31	11,67 11,68 11,69 11,57 11,58	$\begin{array}{l} 6s \left[1^{1}/_{2}\right]^{\circ} - 9p \left[1^{1}/_{2}\right] \\ 6s \left[4^{1}/_{2}\right]^{\circ} - 9p \left[4^{1}/_{2}\right] \\ 6s \left[4^{1}/_{2}\right]^{\circ} - 9p \left[\frac{1}/_{2}\right] \\ 6s \left[4^{1}/_{2}\right]^{\circ} - 5f \left[4^{1}/_{2}\right] \\ 6s \left[4^{1}/_{2}\right]^{\circ} - 5f \left[4^{1}/_{2}\right] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 2 \\ 1 - 0 \\ 2 - 1 \\ 2 - 2 \end{array} $
3796,30 3795,95 3745,69 3745,38 3742,22	40 3 4 10 1	8,31 8,31 8,44 8,44 8,44	11,58 11,58 11,74 11,75 11,75	$\begin{array}{c} 6s \left[1^{1}/_{2}\right]^{\circ} - 5f \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 5f \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 6f \left[1^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 6f \left[1^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 6f \left[2^{1}/_{2}\right] \end{array}$	$ \begin{array}{c} 2-3 \\ 2-2 \\ 1-1 \\ 1-2 \\ 1-2 \end{array} $
3702,74 3696,82 3693,49 3688,80 3685,90	2 4 40 1 40	8,31 8,31 8,31 8,31 8,31	11,66 11,67 11,67 11,67 11,68	$\begin{array}{l} 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9p \ [1^{1}/_{2}] \end{array}$	2-1 2-2 2-3 2-1 2-2
3679,31 3677,54 3669,91 3633,06 3613,06	4 2 10 6 8	8,44 8,44 8,44 8,44 8,31	11,80 11,81 11,81 11,85 11,75	$\begin{array}{l} 6s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{1}{2} \right] \\ 6s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{1}{2} \right] \\ 6s \left[\frac{1}{2} \right]^{\circ} - 10p \left[\frac{1}{2} \right] \\ 6s \left[\frac{1}{2} \right]^{\circ} - 7f \left[\frac{1}{2} \right] \\ 6s \left[\frac{1}{2} \right]^{\circ} - 6f \left[\frac{1}{4} \right] \end{array}$	$ \begin{array}{r} 1-1 \\ 1-2 \\ 1-0 \\ 1-2 \\ 2-2 \end{array} $
3610,32 3592,80 3591,67 3587,02 3563,80	15 2 1 4 3	8,31 8,44 8,44 8,44 8,44	11,75 11,89 11,89 11,89 11,91	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 6f \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 11p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 11p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 11p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 8f \ [1^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-3 \\ 1-1 \\ 1-2 \\ 1-0 \\ 1-2 \end{array} $
3555,92 3554,04 3549,86 3537,35 3536,61	1 10 10 1	8,31 8,31 8,31 8,44 8,44	11,80 11,80 11,81 11,94 11,94	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 10p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 10p \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 10p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 12p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 12p \ [1^{1}/_{2}] \end{array}$	2-2 2-3 2-2 1-1 1-2
3533,48 3517,90 3508,42 3506,74 3496,86	2 2 2 5 1	8,44 8,44 8,31 8,31 8,44	11,94 11,96 11,85 11,85 11,98	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 12p \ [^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 7f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 7f \ [2^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 13p \ [^{1}/_{2}] \end{array}$	1-0 1-2 2-2 2-3 1-0
3472,36 3469,81 3443,83 3442,66 3420,00	4 4 1 3 2	8,31 8,31 8,31 8,31 8,31	11,88 11,89 11,91 11,92 11,94	$\begin{array}{c} 6s \ [4^{1}/_{2}]^{\circ} - 11p \ [2^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} - 41p \ [1^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} - 8f \ [4^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} - 8f \ [2^{1}/_{2}] \\ 6s \ [4^{1}/_{2}]^{\circ} - 12p \ [2^{1}/_{2}] \end{array}$	2-3 2-2 2-2 2-3 2-3
3418,37 3400,79 3400,07	2 1 2	8,31 8,31 8,31	11,94 11,96 11,96	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 12p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9f \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 9f \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{c} 2-2 \\ 2-2 \\ 2-3 \end{array} $

λ, Α	I	E _H , eV	E _B , eV	Transition	J
3384,36 3383,20 3370,34 3358,96 3358,17 3348,63 3340,04	1 1 1 1 1	8,31 8,31 8,31 8,31 8,31 8,31	11,98 11,98 11,99 12,00 12,01 12,02 12,03	$\begin{array}{c} 6s \left[1^{1}/_{2}\right]^{\circ} - 13p \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 13p \left[1^{4}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 10f \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 14p \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 14p \left[1^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 11f \left[2^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 15p \left[2^{1}/_{2}\right] \end{array}$	2-3 2-2 2-3 2-3 2-2 2-3 2-3
1469,610 1295,587 1277,50 1250,203 1192,040	5 8 6 2 2	0,00 0,00 - 0,00 0,00	8,44 9,57 	$\begin{array}{c} 5p^{6} {}^{1}S - 6s [1^{1}/_{2}]^{\circ} \\ 5p^{6} {}^{1}S - 6s' [1^{1}/_{2}]^{\circ} \\ - \\ 5p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ} \\ 5p^{6} {}^{1}S - 5d [1^{1}/_{2}]^{\circ} \end{array}$	0—1 0—1 — 0—1 0—1
1100,46 1088,94 1067,10 1027,04	15 10 -5 10		_ _ _ _	_ _ _ _	- - -

Xe II, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{1_0} 4s^2 4p^6 4d^{1_0} 5s^2 5p^{5^2} P_{3/2}^0$ Ionization potential 171 068.4 cm⁻¹; 21,208 eV

λ, Α	I	$E_{ m H},~{ m eV}$	$E_{\rm B}$, eV	Transition	J
10220,8 10206,9 10095,7 10054,2 9990,9	3 1 1 1 2	— — — —	- - - - -	— — — — —	— — — —
9983,4 9908,9 9895,8 9865,56 9837,8	$ \begin{array}{c} 1 \\ 2 \\ 1 \\ 6 \\ 2 \end{array} $	 	 	 	_ _ _ _ _
9820,90 9810,28 9774,8 9744,8 9734,0	2 2 1 4 3			$- \\ 6p ^4D^{\circ} - 5d' ^2P \\ 5d' ^2P - 1^{\circ} -$	$\begin{array}{c} - \\ - \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ - \end{array}$
9706,2 9698,68 9641,6 9630,95 9615,71	2 50 4 3 4	13,20 — —	14,48 — — —	5d ⁴ P — 6p ⁴ D ° — — — — —	5/2—3/2 — — —
9604,50 9591,35 9577,70 9475,23 9464,3	7 50 2 3 10	13,97 12,59 — 13,97 —	15,26 13,89 — 15,28	$5d' {}^{2}D - 6p {}^{2}D^{\circ}$ $5d {}^{4}F - 6p {}^{4}P^{\circ}$ $ 5d' {}^{2}D - 6p {}^{2}P^{\circ}$ $-$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9447,6 9407,57 9400,59 9331,67 9304,77	1 15 4 1	14 .76 — 12 .54 12 .74 14 .48	16,08 13,86 14,07 15,81	$5d'' ^2D - 6p' ^2P^{\circ}$ $ 6s ^4P - 6p ^4P^{\circ}$ $6s ^2P - 6p ^4D^{\circ}$ $6p ^4D^{\circ} - 5d' ^2P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
9298,7 9288,4	$\frac{2}{5}$	16,02	17,36	5d' ² S-13°	

λ, Å	I	$E_{ m H}^{},{ m eV}$	E_{B} , eV	Transition	J
9265,67 9259,60 9244,15	10 1 2	14,07 —	15,41 	6p 4D°—5d" 2D —	⁵ / ₂ — ³ / ₂ —
9238,59 9226,39 9193,8 9136,6 9106,24	2 7 2 5 1	$ \begin{array}{r} -\\ 13,14\\ 12,74\\ -\\ 14,76 \end{array} $	- 14,48 14,09 - 16,12	$5d^{2}P - 6p^{4}D^{\circ}$ $6s^{2}P - 6p^{4}P^{\circ}$ $ 5d''^{2}D - 6p'^{2}F^{\circ}$	$ \begin{array}{c} -\\ 1/2 - 3/2\\ 3/2 - 1/2\\ -\\ 5/2 - 7/2 \end{array} $
9068,0 8902,66 8881,48 8869,40 8855,74	2 5 2 2 5	 	_ _ _ _	_ _ _ _ _	
8839 ,9 8804 ,61 8796 ,92 8785 ,88 8760 ,14	$\begin{array}{c} 3 \\ 30 \\ 2 \\ 4 \\ 6 \end{array}$	14,00 —		6s' 2D-6p 2D°	
8752,14 8716,19 8655,72 8636,4 8628,94	$7 \\ 50 \\ 3 \\ 2 \\ 25$	13,06 — 13,97	14,48 — — 15,41	$5d^{2}P - 6p^{4}D^{\circ}$ $- \\ - \\ 5d'^{2}D - 6p^{2}D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
8604,23 8584,0 8566,7 8515,19 8500,96	$50 \\ 1 \\ 2 \\ 50 \\ 2$	14,00 — —	15,44 	6s' 2D-6p 2P°	3/2—1/2 —————————————————————————————————
8482,64 8467,8 8446,6 8378,3 8366,4	5 1 2 5 30	13,80 15,28 — 16,39	15,26 16,74 — 17,87	5d' ² D—6p ² D° 6p ² P°—7s ⁴ P — 6p' ² D°—6d ⁴ P	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 1/2 \\ - 5/2 - 3/2 \end{array} $
8351,3 8347,24 8329,44 8317,10 8316,2	3 100 30 40 10	15,81 12,59 — — —	17,29 14,07 — —	5d' ² P—9° 5d ⁴ F—6p ⁴ D° — —	3/2-3/2 5/2-5/2
8297,55 8285,70 8282,85 8262,73 8260,81	100 15 15 30 5	13,58 — — —	15,08 = =	5d ² D—6p ⁴ S° ————————————————————————————————————	5/ ₂ —3/ ₂ — — —
8256,40 8251,30 8245,37 8214,85 8213,50	$\begin{array}{c} 20 \\ 2 \\ 4 \\ 20 \\ 2 \end{array}$				
8186,9 8167,55 8151,80 8144,8 8142,13	10 10 100 3 5	15,02		6p 2S°-4	$\frac{-}{-}$ $\frac{-}{-}$ $3/2$, $1/2$
8136,83 8131,40 8120,16 8115,94 8098,55	30 20 30 50 12	15,08 — — — —	16,60 	6p 4S°—6 — — —	3/2—5/2 — — — —
509					

λ, Λ	I	$E_{\mathrm{H}}^{}$, eV	E _B , eV	Transition	J
8095,13 8080,31 8070,97 8047,28 8038,26	10 50 50 20 100			_ _ _ _ _	_ _ _ _ _
8035,40 8031,64 8028,0 8023,85 8020,07	20 100 1 50 5			$\begin{array}{c} - \\ 6p \ ^2P \ ^{\circ} - 6d \ ^4D \\ - \\ 6p \ ^4D \ ^{\circ} - 5a' \ ^2S \end{array}$	$ \begin{array}{c}$
8014,26 8008,45 8005,8 8001,95 7996,5	50 300 2 10 3	15,75 	- 17,29 - 16,48	$5d' {}^{2}P - 9^{\circ}$ $-6p {}^{4}D^{\circ} - 2$	$ \begin{array}{c} -\\ -\\ 1/_2-3/_2\\ -\\ 1/_2-1/_2 \end{array} $
7992,34 7991,5 7987,99 7981,1 7976,4	$100 \\ 5 \\ 40 \\ 100 \\ 3$	13,86 12,54 — 12,92	15,41 14,09 — 14,48	$6p {}^{4}P^{\circ} - 5d'' {}^{2}D$ $6s {}^{4}P - 6p {}^{4}P^{\circ}$ $- 6s {}^{2}P - 6p {}^{4}D^{\circ}$	$\begin{array}{c} - \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ - \\ 1/2 - 3/2 \end{array}$
7974,76 7942,54 7920,48 7897,7 7889,4	20 100 10 5 50	 15 ,81 	_ _ _ 17,38	 5d' ² P—17° 	- - 3/ ₂ ¹ / ₂
7882,71 7862,7 7828,28 7818,31 7805,8	$\begin{array}{c} 20 \\ 3 \\ 20 \\ 10 \\ 1 \end{array}$	15,81 16,08 — — — 15,81	17,38 17,65 — — 17,40	$5d' {}^{2}P - 6p'' {}^{2}P^{\circ} 6p' {}^{2}P^{\circ} - 7s {}^{2}P - 5d' {}^{2}P - 19^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ - \\ - \\ 3/2 - 3/2 \end{array} $
7787,04 7777,1 7774,18 7772,12 7712,42	$100 \\ 10 \\ 4 \\ 20 \\ 30$	14,76 — — — 13,80	16,36 - - - 15,41	5d" ² D—6p' ² D° — — — 5d' ² D—6p ² D°	5/2—3/2 — — — 3/2—3/2
7670,66 7618,57 7548,45 7530,70 7508,6	200 100 300 50 1	13,31 14,76 13,80 13,38 16,74	14,93 16,39 15,44 15,02 18,40	$5d\ ^4P-6p\ ^4D^{\circ} \ 5d\ ''\ ^2D-6p'\ ^2D^{\circ} \ 5d\ '^2D-6p\ ^2P^{\circ} \ 5d\ ^2D-6p\ ^2S^{\circ} \ 7s\ ^4P-31^{\circ}$	3/2 - 1/2 $5/2 - 5/2$ $3/2 - 1/2$ $3/2 - 1/2$ $1/2 - 3/2$
7503,00 $7495,36$ $7410,14$ $7400,5$ $7378,38$	3 50 4 4 30	15,75 14,09 15,44 13,25 13,58	17,40 15,75 17,12 14,93 15,26	$5d' ^{2}P-19^{\circ}$ $6p ^{4}P^{\circ}-5d' ^{2}P$ $6p ^{2}P^{\circ}-12$ $5d ^{4}P-6p ^{4}D^{\circ}$ $5d ^{2}D-6p ^{2}D^{\circ}$	1/2 - 3/2 $1/2 - 1/2$ $1/2 - 3/2$ $1/2 - 3/2$ $1/2 - 1/2$ $5/2 - 5/2$
7343,37 7339,30 7301,80 7284,34 7279,75	$ \begin{array}{r} 30 \\ 300 \\ 200 \\ 400 \\ 4 \end{array} $	15,26 13,39 13,58 13,38 16,39	16,95 15,08 15,28 15,08 18,09	$6p ^{2}D^{\circ}-10$ $6s' ^{2}D-6p ^{4}S^{\circ}$ $5d ^{2}D-6p ^{2}P^{\circ}$ $5d ^{2}D-6p ^{4}S^{\circ}$ $6p' ^{2}D^{\circ}-6d ^{2}D$	$\begin{array}{c} 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
7276,47 7258,6 7245,38 7215,97 7164,83	4 2 2 20 800	15,41 13,31 14,09 14,25	 17,12 15,02 15,81 15,98	$\begin{array}{c}$	$\begin{array}{c}$
7149,03 7147,50 7143,81	300 100 8	12,74 — —	14,48 	6s ² P—6p ⁴ D° —	³ / ₂ — ³ / ₂ — — —

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λ, Å	I	E _H . eV	E _B , eV	Transition	J
7133,27 7100,8	10 2	14,07 15,08	15,81 16,82	6p ⁴ D°-5d′ ² P 6p ⁴ S°-6d ⁴ D	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
7082,15 7075,0 7072,43	$\begin{array}{c} 200 \\ 2 \\ 4 \end{array}$	14,23 —	15,98 —	5d' ² F—6p' ² F° —	⁵ / ₂ — ⁵ / ₂ —
7052,57 7017,06	$\frac{3}{80}$		15,08	5d ⁴ P—6p ⁴ S°	3/2-3/2
7003,96 6990,88 6942,11 6910,22	50 2000 1000 100	13,25 12,32 — 13,14	15,02 14,10 - 14,03	$ \begin{array}{r} 5d {}^{4}P - 6p {}^{2}S^{\circ} \\ 5d {}^{4}F - 6p {}^{4}D^{\circ} \\ - \\ 5d {}^{2}P - 6p {}^{4}D^{\circ} \end{array} $	$ \begin{array}{c} $
6890,41	3 3	_		- or 2	·2_ ·2
6876,69 6873,2 6805,74 6790,37 6788,71	10 1000 80 100	12,25 13,25 13,39	14,07 15,08 15,41	$\begin{array}{c} - \\ - \\ 5d ^4F - 6p ^4D^{\circ} \\ 5d ^2P - 6p ^4S^{\circ} \\ 6s' ^2D - 6p ^2D^{\circ} \end{array}$	$ \begin{array}{c}$
6702,25 6694,32 6691,22 6663,1 6642,9	80 400 1 2 1	14,23 12,01 15,08 16,36 16,43	16,08 13,86 16,93 18,22 18,30	$5d'$ 2F $-6p'$ ${}^2P^\circ$ $5d$ 4D $-6p$ ${}^4P^\circ$ $6p$ ${}^4S^\circ$ -8 $6p'$ ${}^2D^\circ$ -14 $7s$ 4P -29°	$ \begin{array}{c} 5/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \end{array} $
6638,85 6634,13 6632,44	$\begin{array}{c}2\\6\\2\end{array}$	15,38 15,44	17,25 17,31	6s" 2S-5° 6p 2P°-6d 4F -	$^{1/_{2} - ^{3/_{2}}}_{^{1/_{2} - ^{3/_{2}}}}$
6620,02 $6618,40$	200 50	13,06 13,39	14,93 15,26	$^{5d}^{2}P - ^{6}p^{4}D^{\circ} \\ ^{6}s'^{2}D - ^{6}p^{2}D^{\circ}$	$^{3/}_{2}$ $^{-1/}_{2}$ $^{5/}_{2}$ $^{-5/}_{2}$
6614,96 6613,31	10 4	15,38 —	17 <u>,2</u> 6	6s" ² S—7° —	1/ ₂ —3/ ₂
6598,84 6597,25 6595,01	80 300 800	14,25 13,20 —	16,12 15,08	$5d' ^2F - 6p' ^2F^\circ \ 5d ^4P - 6p ^4S^\circ \ -$	$\begin{array}{c} ^{7/2}_{2}$ $^{-7/2}_{5/2}$ $^{-3/2}_{-}$
6573,68 6569,13 6563,19	30 5 15	13,38 13,86 13,14	15,26 $15,75$ $15,02$	$5d\ ^{2}D-6p\ ^{2}D^{\circ}\ 6p\ ^{4}P^{\circ}-5d^{'\ ^{2}P}\ 5d\ ^{2}P-6p\ ^{2}S^{\circ}$	$\frac{3}{2}$ _5 $\frac{5}{2}$ $\frac{3}{2}$ _1 $\frac{1}{2}$ $\frac{1}{2}$ _1 $\frac{1}{2}$
6556,70	4	$\begin{cases} 13,39 \\ 12,59 \end{cases}$	15,28 14,48	$6s' ^{2}D - 6p ^{2}P^{\circ}$ $5d ^{4}F - 6p ^{4}D^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
6528,65 6515,48		$14,23 \\ \{ \begin{array}{c} 16,46 \\ 15,41 \\ \end{array} $	16,12 18,36 17,31	5d' ² F-6p' ² F° 6p' ² P°-6d' ² D 5d" ² D-11°	$\frac{5}{2}$ $\frac{7}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
6512,83 6479,69 6461,48 6442,3	$ \begin{array}{c} 300 \\ 2 \\ 3 \\ 1 \end{array} $	13,38 15,38 — 15,98	15,28 17,29 — 17,90	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{3/2}_{1/2}$ $^{3/2}_{1/2}$ $^{3/2}_{2}$ $^{5/2}$
6426,73 6421,47 6418,58 6397,99 6375,28	2 1 20 60 100	16,08 13,89 14,09 12,54 13,14	18,00 15,81 16,02 14,48 15,08	$6p' {}^{2}P^{\circ} - 6d {}^{2}P^{\circ}$ $6p {}^{4}P^{\circ} - 5d' {}^{2}P$ $6p {}^{4}P^{\circ} - 5d' {}^{2}S$ $6s {}^{4}P - 6p {}^{4}D^{\circ}$ $5d {}^{2}P - 6p {}^{4}S^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
6362,8 6356,35 6353,25 6343,96 6325,17	2 500 50 300 2	15,41 { 13,86 { 14,48 11,91	17,36 15,81 16,43 13,86	$-5d'' ^2D-15^{\circ}$ $6p ^4P^{\circ}-5d' ^2P$ $6p ^4D^{\circ}-7s ^4P$ $5d ^4D-6p ^4P^{\circ}$	$ \begin{array}{c} - \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
6311,46 6305,01 6300,86	5 1 100	 15,28 16,43 13,06	17,24 18,40 15,02	$\begin{array}{c} - \\ 6p ^{2}P^{\circ} - 6d ^{4}F \\ 7s ^{4}P - 31^{\circ} \\ 5d ^{2}P - 6p ^{2}S^{\circ} \end{array}$	$ \begin{array}{c} - & 3/_2 - 5/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 1/_2 \end{array} $

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λ, Â	I	E _H , eV	E _B , eV	Transition	J
6298,31 6296,39	20 10	13,31 16,39	15,28 18,36	$\frac{5d\ ^4P-6p\ ^2P^{\circ}}{6p'\ ^2D^{\circ}-6d'\ ^2D}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
6284,41 6277,54 6270,82 6255,32 6235,40	50 300 400 2 1	15,41 11,91 14,00 15,26 15,41	17,38 13,89 15,98 17,24 17,40	$5d'' ^{2}D - 6p'' ^{2}P^{\circ}$ $5d ^{4}D - 6p ^{4}P^{\circ}$ $6s' ^{2}D - 6p' ^{2}F^{\circ}$ $6p ^{2}D^{\circ} - 6d ^{4}F$ $5d'' ^{2}D - 19^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
6234,04 6206,16 6203,45 6196,63	10 200 1 4	16,48 — 15,38 14,48	18,47 17,38 16,48	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
6194,07 6185,93 6185,03 6184,57 6155,28 6146,45	300 1 15 20 1 50	15,38 16,36 13,97 12,92 16,12 15,38	17,38 18,09 15,98 14,93 18,14 17,40	$6s'' {}^{2}S - 6p'' {}^{2}P^{\circ}$ $6p' {}^{2}D^{\circ} - 6d' {}^{2}D$ $5d' {}^{2}D - 6p' {}^{2}F^{\circ}$ $6s {}^{2}P - 6p {}^{4}D^{\circ}$ $6p' {}^{2}F^{\circ} - 7s' {}^{2}D$ $6s'' {}^{2}S - 19^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
6143,40 6127,44 6115,08 6101,43 6097,59	$\begin{array}{c} 1\\2\\50\\200\\1000 \end{array}$	16,08 13,06 13,25 13,38 11,83	18,09 15,08 15,28 15,41 13,86	$6p' ^{2}P^{\circ} - 6d ^{2}D$ $5d ^{2}P - 6p ^{4}S^{\circ}$ $5d ^{4}P - 6p ^{2}P^{\circ}$ $5d ^{2}D - 6p ^{2}D^{\circ}$ $5d ^{4}D - 6p ^{4}P^{\circ}$	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \end{array}$
6093,56 6083,21 6051,15 6048,53 6036,20	300 1 1000 5 500	14,48 15,08 11,83 15,26 11,83	16,51 17,12 13,89 17,31 13,89	$6p ^4D^{\circ} - 7s ^4P$ $6p ^4S^{\circ} - 12$ $5d ^4D - 6p ^4P^{\circ}$ $6p ^2D^{\circ} - 6d ^4F$ $5d ^4D - 6p ^4P^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 7/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
6024,77 6008,92 5998,3 5991,86 5988,44	3 100 1 1 1	15,41 13,20 13,38 15,41	17,47 15,26 15,44 17,48	$6p ^{2}D^{\circ}-6d ^{4}P$ $5d ^{4}P-6p ^{2}D^{\circ}$ $5d ^{2}D-6p ^{2}P^{\circ}$ $5d '' ^{2}D-21^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ - \end{array} $
5976,46 5971,13 5958,03 5945,53 5934,55	1000 200 50 300 2	11,79 14,00 13,20 12,01	13,86 16,08 15,28 14,09	6s ⁴ P-6p ⁴ P° 6s' ² D-6p' ² P° 5d ⁴ P-6p ² P° 5d ⁴ D-6p ⁴ P°	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 1/2 - 1/2 \\ - \end{array} $
5921,50 5917,44 5912,80 5909,67 5905,13	2 50 5 30 200	15,02 11,79 13,31 15,38 12,92	17,12 13,89 15,41 17,48 15,02	$6p ^2S^{\circ}$ —12 $6s ^4P$ — $6p ^4P^{\circ}$ $5d ^4P$ — $6p ^2D^{\circ}$ $6s'' ^2S$ —21° $6s ^2P$ — $6p ^2S^{\circ}$	$ \begin{array}{c} 1/3 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $
5893,29 5859,47 5855,47 5846,69	150 2 1 2	{ 16,12 13,97 16,46 15,98	18,22 16,08 18,57 18,09	$\begin{array}{c} 6p' {}^{2}F^{\circ} - 14 \\ 5d' {}^{2}D - 6p' {}^{2}P^{\circ} \\ 6p' {}^{2}P^{\circ} - 7s' {}^{2}D \\ 6p' {}^{2}F^{\circ} - 6d {}^{2}D \\ - \\ 6p {}^{4}D^{\circ} - 6 \end{array}$	$ \begin{array}{c} 7/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ - 3/2 - 5/2 \end{array} $
5835,5 5821,57 5815,96 5809,5 5791,98 5776,39	5 1 50 1 1 100	14,48 14,23 13,31 17,24 16,08 13,14	16,60 16,36 15,44 19,38 18,22 15,28	$5d' ^{2}F - 6p' ^{2}D^{\circ}$ $5d ^{4}P - 6p ^{2}P^{\circ}$ $6d ^{4}F - 39^{\circ}$ $6p' ^{2}P^{\circ} - 14$ $5d ^{2}P - 6p ^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5758,65 5754,18 5752,56 5751,03 5746,88	100 2 10 200 5	13,97 	16,12 15,08 15,41	$5d' ^{2}D - 6p' ^{4}F^{\circ}$ $- 6s ^{2}P - 6p ^{4}S^{\circ}$ $5d ^{2}P - 6p ^{2}D^{\circ}$ $- $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

λ. Α	I	$E_{ m H}$, eV	E _B , eV	Transition	J
5726,91 5716,19 5699,61	200 100 100	{ 13,86 14,23 16,39 13,80	16,02 16,39 18,56 15,98	$6p ^4P^{\circ} - 5d' ^2S$ $5d' ^2F - 6p' ^2D^{\circ}$ $6p' ^2D^{\circ} - 6d' ^2D$ $5d' ^2D - 6p' ^2F^{\circ}$	$ \frac{3}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{5}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{5}{2} $
5686,49 5681,8 7	$\frac{2}{1}$	16,39	18,57	$6p' {}^{2}D^{\circ} - 7s' {}^{2}D$	5/ ₂ —3/ ₂
5675,15 5670,96 5667,56 5664,02 5659,38	1 50 300 3 150	12,74 15,28 11,91 — 13,14	14,93 17,47 14,09 — 15,44	$\begin{array}{c} 6s ^{2}P-6p ^{4}D^{\circ} \\ 6p ^{2}P^{\circ}-6d ^{4}P \\ 5d ^{4}D-6p ^{4}P^{\circ} \\ - \\ 5d ^{2}P-6p ^{2}P^{\circ} \end{array}$	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ - \\ 1/2 - 1/2 \end{array}$
5633,24 5624,78 5616,67 5612,89 5594,87	3 1 150 1 4	16,36 13,06 15,44	18,56 15,26 17,65	$\begin{array}{c} - \\ 6p' \ ^2D° - 6d' \ ^2D \\ 5d \ ^2P - 6p \ ^2D° \\ 6p \ ^2P° - 7s \ ^2P \\ - \end{array}$	$ \begin{array}{c} - & - & - \\ 3/2 - 5/2 & - & 5/2 \\ 3/2 - 5/2 & - & 1/2 - & 3/2 \\ - & - & - & - \end{array} $
5591,61 5583,5 5581,93 5572,19 5554,99	$\begin{array}{c} 2 \\ 2 \\ 2 \\ 50 \\ 3 \end{array}$	16,36 — — —	18,57 — — — —	6p' 2D°—7s' 2D — — — —	3/ ₂ —3/ ₂ — — — —
5551 ,50 5531 ,07 5525 ,59 5518 ,56 5509 ,20	$\begin{array}{c} 2 \\ 400 \\ 50 \\ 1 \\ 2 \end{array}$	11 ,83 15 ,41 11 ,83	14,07 17,65 14,07	$\begin{array}{c} - \\ 5d ^4D - 6p ^4D^{\circ} \\ 6p ^2D^{\circ} - 7s ^2P \\ 5d ^4D - 6p ^4D^{\circ} \\ - \end{array}$	$\begin{array}{c} - \\ 7/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 5/2 \\ - \end{array}$
5507,46 5495,07 5472,61 5469,58 5460,39	$\begin{array}{c} 2\\ 20\\ 500\\ 20\\ 300 \end{array}$			$ 5d\ ^4D-6p\ ^4D^{\circ}$ $6p\ ^4D^{\circ}-7s\ ^4P$ $5d\ ^4D-6p\ ^4D^{\circ}$	$ ^{7/2}$ $^{3/2}$ $^{1/2}$ $^{5/2}$ $^{7/2}$
5450,90 5450,45 5445,52 5438,96 5428,07	$ \begin{array}{c} 20 \\ 100 \\ 150 \\ 400 \\ 2 \end{array} $	13,80 13,14 15,44 12,74 16,08	16,08 15,41 17,72 15,02 18,36	$5d'\ ^{2}D-6p'\ ^{2}P^{\circ} \ 5d\ ^{2}P-6p\ ^{2}D^{\circ} \ 6p\ ^{2}P^{\circ}-7s\ ^{2}P \ 6s\ ^{2}P-6p\ ^{2}S^{\circ} \ 6p'\ ^{2}P^{\circ}-6d'\ ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
5419,15 5418,2 5415,36 5372,39 5368,07	2000 2 50 300 100	11,79 15,02 11,79 13,14	14,07 17,31 14,09 15,44	$6s ^4P - 6p ^4D^{\circ}$ $ 6p ^2S^{\circ} - 6d ^4F$ $6s ^4P - 6p ^4P^{\circ}$ $5d ^2P - 6p ^2P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5363 ,27 5339 ,38 5327 ,90	150 1100 3	15,41 { 11,54 14,48	17,72 13,86 16,80	$6p ^{2}D^{\circ} - 7s ^{2}P$ $6s ^{4}P - 6p ^{4}P^{\circ}$ $6p ^{4}D^{\circ} - 6d ^{4}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 7/2 \end{array} $
5313,87 5309,27	800 200	$14,10 \\ 12,74$	16,43 15,08	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	-7/2 - 5/2 $3/2 - 3/2$
5292,22 5291,3 5282,46 5268,31 5261,95	1000 2 2 50 200	11,54 14,48 13,06 14,00	13,89 16,82 15,41 16,36	$6s ^4P - 6p ^4P^{\circ}$ $-6p ^4D^{\circ} - 6d ^4D$ $5d ^2D - 6p ^2D^{\circ}$ $6s' ^2D - 6p' ^2D^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
5260,44 5259,89 5247,75 5226,90 5226,62	200 30 20 2 2	12,92 14,07 	15,28 16,43 - 18,40 17,65	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 5/2 \\ - \\ 1/2 - 3/2 \end{array} $
5201,88 5201,42	2 20	15,98 13,97	18,36 16,36	$6p^{2}P - 7s^{2}P$ $6p'^{2}F^{\circ} - 6d'^{2}D$ $6d'^{2}D - 6p'^{2}D^{\circ}$	$\frac{3}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{3}{2}$

λ, λ	I	E _H , eV	EB. eV	Transition	J
5199,9 5194,92 5192,10	1 5 80	14,93 14,09 15,08	17 ,31 16 ,48 17 ,47	6p ⁴ D°—6d ⁴ F 6p ⁴ P°—2 6p ⁴ S°—6d ⁴ P	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
5191,37 5188,11 5184,48 5178,82 5125,70	300 200 50 50 30	12,54 15,26 14,00 13,58 13,97	14,93 17,65 16,39 15,98 16,39	$6s ^4P - 6p ^4D^{\circ} \ 6p ^2D^{\circ} - 7s ^2P \ 6s' ^2D - 6p' ^2D^{\circ} \ 5d ^2D - 6p' ^2F^{\circ} \ 6d' ^2D - 6p' ^2D^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 5/2 \end{array} $
5122,42 5117,76 5108,58 5099,59 5092,02	200 2 2 5 60	14,09 15,44 16,12	16,51 17,87 18,56	$6p {}^{4}P^{\circ} - 7s {}^{4}P$ $- 6p {}^{2}P^{\circ} - 6d {}^{4}P$ $- 6p' {}^{2}F^{\circ} - 6d' {}^{2}D$	$^{1/2}$ _{3/2} _{1/2}_{3/2} _{7/2}_{5/2}
5081,07 5080,62 5069,82 5066,33 5052,54	30 600 10 3 30	15,28 14,07 — — 14,48	17,77 16,51 — — 16,93	$ \begin{array}{r} 6p \ ^{2}P^{\circ}-7s \ ^{2}P \\ 6p \ ^{4}D^{\circ}-7s \ ^{4}P \\ - \\ - \\ 6p \ ^{4}D^{\circ}-8 \end{array} $	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 3/2 \\ - \\ - \\ 3/2 - 5/2 \end{array} $
5044,92 5036,15 5018,75 5012,83 5001,01	150 3 1 50 3	14,00 15,41 14,76 14,48	16,46 17,87 17,23 16,95	$6s' {}^{2}D - 6p' {}^{2}P^{\circ}$ $6p {}^{2}D^{\circ} - 6d {}^{4}P$ $5d'' {}^{2}D - 3^{\circ}$ $6p {}^{4}D^{\circ} - 10$	3/2 - 1/2 $3/2 - 3/2$ $5/2 - 7/2$ $3/2 - 5/2$ $-$
4993,93 4993,03 4991,17 4988,77 4974,87	5 10 100 300 2	47,81 12,54 16,08 12,92 15,41	18,29 15,02 18,56 15,41 17,90	$5d' {}^{2}P-27^{\circ}$ $6s {}^{4}P-6p {}^{2}S^{\circ}$ $6p' {}^{2}P^{\circ}-6d' {}^{2}D$ $6s {}^{2}P-6p {}^{2}D^{\circ}$ $6p {}^{2}D^{\circ}-6d {}^{2}D$	$ \begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4974,41 4972,71 4971,71 4965,00 4962,8	1 400 200 4 1	14,76 13,58 — 16,08 15,28	17,26 16,08 — 18,57 17,78	$5d''^{2}D-7^{\circ}$ $5d^{2}D-6p'^{2}P^{\circ}$ $-6p'^{2}P^{\circ}-7s'^{2}D$ $6p^{2}P^{\circ}-6d^{4}P$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
4946,72 4921,48 4919,66 4905,20 4899,9	$ \begin{array}{c} 1 \\ 800 \\ 200 \\ 2 \\ 1 \end{array} $	14,10 12,74 12,92 — 14,07	16,60 15,26 15,44 — 16,60	$\begin{array}{c} 6p ^4D^{\circ} - 6 \\ 6s ^2P - 6p ^2D^{\circ} \\ 6s ^2P - 6p ^2P^{\circ} \\ - \\ 6p ^4D^{\circ} - 6 \end{array}$	$ \begin{array}{c} 7/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ - 5/2 - 5/2 \end{array} $
4890,09 4887,30 4885,19 4884,15 4883,53	300 300 4 100 600	11,54 12,74 - 14,93 12,54	14,07 15,28 — 17,47 15,08	$ \begin{array}{r} 6s {}^{4}P - 6p {}^{4}D^{\circ} \\ 6s {}^{2}P - 6p {}^{2}P^{\circ} \\ - \\ 6p {}^{4}D^{\circ} - 6d {}^{4}P \\ 6s {}^{4}P - 6p {}^{4}S^{\circ} \end{array} $	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ - \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
4876,50 4862,54 4853,77 4844,33 4840,87	500 800 40 2000 1	13,58 13,89 13,80 11,54 15,44	16,12 16,43 16,36 14,10 18,00	$5d^{2}D-6p'^{2}F^{\circ}$ $6p^{4}P^{\circ}-7s^{4}P$ $5d'^{2}D-6p'^{2}D^{\circ}$ $6s^{4}P-6p^{4}D^{\circ}$ $6p^{2}P^{\circ}-6d^{2}P$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 5/2 - 7/2 \\ 1/2 - 1/2 \end{array} $
4823,41 4818,02 4817,22 4806,92 4799,45	300 200 40 3 15	13,86 11,91 15,08 — 15,98	16,43 14,48 17,65 — 18,56	$6p ^4P^{\circ} - 7s ^4P$ $5d ^4D - 6p ^4D^{\circ}$ $6p ^4S^{\circ} - 7s ^2P$ $ 6p' ^2F^{\circ} - 6d' ^2D$	$ \begin{array}{c} 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ - 5/2 - 5/2 \end{array} $
4796,53 4795,40 4790,20 4787,77 4786,65	6 3 3 100 10	15,81 13,80 15,28	18,40 16,39 17,87	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$

			·		
λ, Α	I	E _H , eV	$E_{\mathrm{B}},\;\mathrm{eV}$	Transition	J
4779,18 4775,76 4775,18 4773,19 4769,05	80 8 5 80 450	11,27 15,41 15,98 14,76 13,38	13,86 18,00 18,57 17,36 15,98	$5p^{6} {}^{2}S - 6p {}^{4}P^{\circ}$ $6p {}^{2}D^{\circ} - 6d {}^{2}P$ $6p' {}^{2}F^{\circ} - 7s' {}^{2}D$ $5d'' {}^{2}D - 15^{\circ}$ $5d {}^{2}D - 6p' {}^{2}F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array} $
4732,51 4731,19 4721,00	15 100 2	{ 13,86 14,76 15,28	16,48 17,38 17,90	6p 4P°—2 5d" 2D—6p" 2P° 6p 2P°—6d 2D	$\begin{array}{c} 3/_2 - 1/_2 \\ 5/_2 - 3/_2 \\ 3/_2 - 5/_2 \end{array}$
4715 ,18 4712 ,63	100 40	15,02 —	17 ,65 —	6p ² S°—7s ² P	1/ ₂ —3/ ₂
4708,92 4706,96 4704,67 4699,62	$ \begin{array}{c} 8 \\ 2 \\ 10 \\ 3 \\ 300 \end{array} $	13,89 	16,51 17,40 17,90	$6p ^4P^{\circ} - 7s ^4P$ $ 5d'' ^2D - 19^{\circ}$ $6p ^2D^{\circ} - 6d ^2D$	$\begin{array}{c} 5/2 - 3/2 \\ - \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \end{array}$
4698,01 4693,34 4679,45 4678,31 4676,75	$ \begin{array}{r} 300 \\ 15 \\ 3 \\ 2 \\ 2 \end{array} $	14,48 15,08 15,75 15,44	17,12 17,72 18,40 18,09	$6\dot{p}\ ^4D^{\circ}$ —12 $6p\ ^4S^{\circ}$ —7s 2P $5d'\ ^2P$ —31° $6p\ ^2P^{\circ}$ —6d 2D	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
4676,46 4674,56	$20\overline{0}$ 40		 14 ,48	_ _ 5d ⁴ D-6p ⁴ D°	
4672,20 4668,49 4666,28 4653,00	100 100 40 40	13,86 13,80 15,81 13,31	16,46 16,46 18,47 15,98	$5a' P - 6p' P$ $6p ^4P - 7s ^4P$ $5d' ^2D - 6p' ^2P^\circ$ $5d' ^2P - 33^\circ$ $5d ^4P - 6p' ^2F^\circ$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
4651 ,94 4649 ,17	${\frac{200}{2}}$	12,74 —	15,41 —	6s ² P—6p ² D° —	³ / ₂ — ³ / ₂
4633,30 4620,11 4617,50	$\begin{array}{c} 50 \\ 2 \\ 90 \end{array}$	12,59 - 15,41	15,26	$5d {}^{4}F - 6p {}^{2}D^{\circ}$	⁵ / ₂ — ⁵ / ₂ —
4617,50 4615,50 4615,06 4603,03 4596,30 4593,70	200 100 600 1 6	13,41 13,39 13,86 11,79 15,02 13,38	18,09 16,08 16,55 14,48 17,72 16,08	$6p ^2D^{\circ} - 6d ^2D$ $6s' ^2D - 6p' ^2P^{\circ}$ $6p ^4P^{\circ} - 4$ $6s ^4P - 6p ^4D^{\circ}$ $6p ^2S^{\circ} - 7s ^2P$ $5d ^2D - 6p' ^2P^{\circ}$	3/2 - 3/2 $5/2 - 3/2$ $3/2 - 1/2$, $3/2$ $3/2 - 3/2$ $1/2 - 1/2$ $3/2 - 3/2$
4592,05 4585,48 4580,70 4577,06 4571,85	300 500 80 200 30	15,08 14,10 16,39 14,10	17,78 16,80 19,10 16,80	6p 4S°-6d 4P 6p 4D°-6d 4D 6p 2D°-6d' 2F 6p 4D°-6d 4D -	3/2 - 5/2 $7/2 - 7/2$ $5/2 - 5/2$ $7/2 - 5/2$ $7/2 - 5/2$
4569,12 4563,00 4555,94 4550,79 4545,23	$\begin{array}{c} 4 \\ 2 \\ 200 \\ 10 \\ 400 \end{array}$			$\begin{array}{c} - \\ - \\ 6p \ ^4D^{\circ} - 20 \\ 6p \ ^2P^{\circ} - 6d \ ^2P \\ 6p \ ^4D^{\circ} - 6d \ ^4D \end{array}$	$\begin{array}{c} - \\ - \\ 3/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 7/2 \end{array}$
4540,89 4536,92 4532,49 4524,21 4521,86	400 80 200 200 100	15,41 14,09 13,39 12,54 16,36	18,14 16,82 16,12 15,28 19,10	$6p \ ^{2}D^{\circ}-7s' \ ^{2}D$ $6p \ ^{4}P^{\circ}-6d \ ^{4}D$ $6s' \ ^{2}D-6p' \ ^{2}F^{\circ}$ $6s \ ^{4}P-6p \ ^{2}P^{\circ}$ $6p' \ ^{2}D^{\circ}-6d' \ ^{2}F$	3/2 - 5/2 $1/2 - 3/2$ $5/2 - 7/2$ $1/2 - 3/2$ $3/2 - 5/2$
4519,69 4511,80 4507,11 4488,60 4485,95	3 2 5 4 20				
4480,86 4473,85	500 4	14,48 —	17 <u>,</u> 24	6p 4D°—6d 4F	³ / ₂ — ⁵ / ₂
588					

λ, Α	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
4470,90 4464,60 4462,19	30 1 1000	13,58 13,20	16,36 15,98	5d ² D—6p′ ² D° 5d ⁴ P—6p′ ² F°	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
4448 ,13 4440 ,95 4427 ,52	$\begin{array}{c} 500 \\ 50 \\ 2 \end{array}$	15 <u>,0</u> 8	17,87	6p 4S°—6d 4P	3/ ₂ —3/ ₂
4416,07 4414,84	$\frac{150}{300}$	15,41 13,58	$18,22 \\ 16,39$	$\frac{6p^{2}D^{\circ}-14}{5d^{2}D-6p'^{2}D^{\circ}}$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
4406,88 4395,77 4393,20 4384,93 4379,44	200 500 500 60 10	15,28 14,23 15,08 11,27 15,26	18,09 17,05 17,90 14,09 18,09	$6p^{2}P^{\circ}-6d^{2}D$ $5d'^{2}F-4f'^{2}F$ $6p^{4}S^{\circ}-6d^{2}D$ $5p^{6}^{2}S-6p^{4}P^{\circ}$ $6p^{2}D^{\circ}-6d^{2}D$	3/2 - 3/2 $5/2 - 7/2$ $3/2 - 5/2$ $1/2 - 1/2$ $5/2 - 3/2$
4373,78 4372,46 4369,20 4367,05 4360,32	$ \begin{array}{r} 100 \\ 2 \\ 200 \\ 30 \\ 2 \end{array} $	14,48 14,10 14,09 14,10	17,31 16,93 16,93 16,93	6p ⁴ D°-6d ⁴ F 6p ⁴ D°-8 6p ⁴ P°-18 6p ⁴ D°-6d ⁴ F	3/2 - 3/2 $7/2 - 5/2$ $1/2 - 1/2$ $7/2 - 7/2$ $-$
4342,56 4337,07 4335,81 4330,52 4321,82	6 30 10 1000 40	14,10 15,28 14,07 14,07 12,54	16,95 18,14 16,93 16,93 15,41	$6p {}^{4}D^{\circ} - 10$ $6p {}^{2}P^{\circ} - 7s' {}^{2}D$ $6p {}^{4}D^{\circ} - 8$ $6p {}^{4}D^{\circ} - 6d {}^{4}F$ $6s {}^{4}P - 6p {}^{2}D^{\circ}$	7/2 - 5/2 $3/2 - 5/2$ $5/2 - 5/2$ $5/2 - 7/2$ $1/2 - 3/2$
4310,51 4306,21 4296,75 4296,40 4269,84	500 1 2 500 40	15,26 15,41 15,41 13,86 12,54	18,14 18,29 18,30 16,74 15,44	$6p ^2D^{\circ} - 7s' ^2D$ $5d'' ^2D - 25^{\circ}$ $5d'' ^2D - 29^{\circ}$ $6p ^4P^{\circ} - 7s ^4P$ $6s ^4P - 6p ^2P^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \end{array} $
4263,57 4263,44 4251,57 4245,38 4244,41	5 30 100 500 30	15,38 	18,29 	$6s'' {}^{2}S-25^{\circ}$ $ 6p {}^{2}P^{\circ}-6d' {}^{2}D$ $6p {}^{4}P^{\circ}-6d {}^{4}D$ $5d {}^{2}P-6p' {}^{2}F^{\circ}$	$^{1/2}$ _{2}_{3/2}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-}_{-
4243,88 4238,25 4223,00 4215,60 4214,69	10 500 400 200 6	12,01 13,89 15,28 11,54 13,14	14,93 16,80 18,22 14,48 16,08	$5d ^4D - 6p ^4D^{\circ}$ $6p ^4P^{\circ} - 6d ^4D$ $6p ^2P^{\circ} - 14$ $6s ^4P - 6p ^4D^{\circ}$ $5d ^2P - 6p' ^2P^{\circ}$	$ \begin{array}{c} 1/2 - 1/2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
4213,72 4209,47 4208,48 4203,22 4201,25	$400 \\ 200 \\ 400 \\ 5 \\ 15$	14,93 13,89 13,86 16,43 15,41	17,87 16,82 16,80 19,38 18,36	$6p ^4P^{\circ} - 6d ^4P$ $6p ^4P^{\circ} - 6d ^4D$ $6p ^4P^{\circ} - 6d ^4D$ $7s ^4P - 39^{\circ}$ $6p ^2D^{\circ} - 6d' ^2D$	$ \begin{array}{c} 1/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
4197,81 4193,15 4180,10 4170,99 4162,16	10 500 1000 8 60	15,26 13,86 16,12 13,38	18,22 16,82 19,10 16,36	$6p ^{2}D^{\circ}$ —14 — $6p ^{4}P^{\circ}$ —6 $d ^{4}D$ $6p' ^{2}F^{\circ}$ —6 $d' ^{2}F$ $5d ^{2}D$ —6 $p' ^{2}D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ - \\ 3/2 - 7/2 \\ 7/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
4158,04 4156,17	200 2	15,02	18,00	6p 2S°—6d 2P ————————————————————————————————————	$^{1/_{2}-^{1}/_{2}}_{-^{3/_{2}-^{1}/_{2}}}$
4148,19 4138,81 4131,01	$\begin{array}{c}2\\3\\20\end{array}$	$ \begin{array}{r} 14.48 \\ - \\ 13.39 \end{array} $	$\frac{17,47}{-16,39}$	6p 4D°—6d 4P — 6s′ 2D—6p′ 2D°	$\frac{\frac{5}{2}-\frac{7}{2}}{\frac{5}{2}-\frac{5}{2}}$
4121,86 4113,52 4413,26 4112,14 4110,41	5 2 2 30 30	14,23 13,38 15,38 15,08 12,01	17,23 16,39 18,40 18,09 15,02	$5d' ^2F - 3^{\circ}$ $5d ^2D - 6p' ^2D^{\circ}$ $6s'' ^2S - 31^{\circ}$ $6p ^4S^{\circ} - 6d ^2D$ $5d ^4D - 6p ^2S^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \end{array} $

λ, Å	I	E _H , eV	$E_{\rm B}$, eV	Transition	J
4104,95 4103,10 4100,97 4100,34 4098,89	40 8 1 20 100	13,06 16,08 14,23 11,91 14,09	16,08 19,10 17,25 14,93 17,12	$5d^{2}P - 6p'^{2}P^{\circ}$ $6p'^{2}P^{\circ} - 6d'^{2}F$ $5d'^{2}F - 5^{\circ}$ $5d^{4}D - 6p^{4}D^{\circ}$ $6p^{4}P^{\circ} - 12$	$ \begin{array}{c} 3/2 - \frac{3}{2} \\ 3/2 - \frac{5}{2} \\ 5/2 - \frac{3}{2} \\ 3/2 - \frac{1}{2} \\ 1/2 - \frac{3}{2} \end{array} $
4091,88 4073,50 4072,10 4062,12 4061,06	3 15 6 6 3	14,23 13,31 14,07 13,89 12,92	17,26 16,36 17,12 16,93 15,98	$5d' ^2F - 7^{\circ}$ $5d ^4P - 6p' ^2D^{\circ}$ $6p ^4D^{\circ} - 12$ $6p ^4P^{\circ} - 8$ $6s ^2P - 6p' ^2F^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 1/2 - 5/2 \end{array} $
4057,46 4051,27 4044,90	200 10 8	13,89 15,08	16,93 18,14 —	6p 4P°—6d 4F 6p 4S°—7s′ 2D	$\frac{\frac{5}{2}-\frac{7}{2}}{\frac{3}{2}-\frac{5}{2}}$
4044,64 $4039,69$	6 1	13,86 14,23	16,92 17,29	6 <i>p</i> ⁴ <i>P</i> °—16 5 <i>d</i> ′ ² <i>F</i> —9°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
4037,59 4037,29 4035,87 4029,82 4027,97	200 100 1 1 3	15,02 13,86 12,01 14,93	18,09 16,93 15,08 18,00	$6p ^2S^{\circ} - 6d ^2D$ $6p ^4P^{\circ} - 18$ $5d ^4D - 6p ^4S^{\circ}$ $6p ^4D^{\circ} - 6d ^2P$	1/2 - 3/2 $3/2 - 1/2$ $1/2 - 3/2$ $1/2 - 1/2$ $$
4026,20 4025,19 4017,86 4016,56	5 30 2 2 80	15,28 13,38 15,38 —	18,36 16,46 18,47	$6p \ ^{2}P^{\circ}-6d' \ ^{2}D \ 5d \ ^{2}D-6p' \ ^{2}P^{\circ} \ 6s'' \ ^{2}S-33^{\circ} \ -5d'' \ ^{2}D-35^{\circ}$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ - 5/ \end{array} $
4002,35 4000,55 3996,05 3990,33 3980,41 3978,98	5 3 60 2 2	15,41 — 13,25 14,09 14,25 15,02	18,51 — 16,36 17,20 17,36 18,14	$5d \ ^4P - 6p' \ ^2D^{\circ}$ $6p \ ^4P^{\circ} - 20$ $5d' \ ^2F - 15^{\circ}$ $6p \ ^2S^{\circ} - 7s' \ ^2D$	3/2-5/2 - $1/2-3/2$ $1/2-1/2$ $7/2-5/2$ $1/2-5/2$
3975,59 3972,58 3954,73 3951,61 3943,57	4 50 20 5 20	11,91 15,98 14,23 15,08 11,79	15,02 19,10 17,36 18,22 14,93	$5d ^4D - 6p ^2S^{\circ}$ $6p' ^2F^{\circ} - 6d' ^2F$ $5d' ^2F - 15^{\circ}$ $6p ^4S^{\circ} - 14$ $6s ^4P - 6p ^4D^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 5/2 - 5 \cdot 2 \\ 5/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3942,21 3938,92 3937,66 3933,22 3926,80	3 15 2 1 1	13,31 15,41 14,10 12,92 14,23	16,46 18,56 17,24 16,08 17,38	$5d^{4}P - 6p'^{2}P^{\circ}$ $5d''^{2}D - 37^{\circ}$ $6p^{4}D^{\circ} - 6d^{4}F$ $6s^{2}P - 6p'^{2}P^{\circ}$ $5d'^{2}F - 6p'^{2}P^{\circ}$	3/2— $1/2$ $3/2$ — $5/2$ $7/2$ — $5/2$ $1/2$ — $3/2$ $5/2$ — $3/2$
3918,57 3916,60 3907,91 3905,85 3905,34	2 1 100 10 1	15,41 14,93 14,07 11,91 14,48	18,57 18,09 17,24 15,08 17,65	$\begin{array}{c} 6p \ ^2D^{\circ} - 7s' \ ^2D \\ 6p \ ^4D^{\circ} - 6d \ ^2D \\ 6p \ ^4D^{\circ} - 6d \ ^4F \\ 5d \ ^4D - 6p \ ^4S^{\circ} \\ 6p \ ^4D^{\circ} - 7s \ ^3P \end{array}$	$ \begin{array}{c} 3/2 - 3/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array} $
3885,45 3885,00 3869,63 3858,53 3849,87	4 20 20 20 20 50		 16,39 16,46 14,48 17,31	$5d ^{4}P - 6p' ^{2}D^{\circ}$ $5d ^{4}P - 6p' ^{2}P^{\circ}$ $5p^{6} ^{2}S - 6p ^{4}D^{\circ}$ $6p ^{4}P^{\circ} - 6d ^{2}F$	$ \begin{array}{c} - \\ 5/2 - 5/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \end{array} $
3848,58 3829,77 3826,27 3823,35 3811,05	6 10 2 2 2 40	13,14 13,89 14,07 — 11,83	16,36 17,12 17,31 — 15,08	$6p ^{2}P - 6p' ^{2}D^{\circ}$ $6p ^{4}P^{\circ} - 12$ $6p ^{4}D^{\circ} - 6d ^{4}F$ $ 5d ^{4}D - 6p ^{4}S^{\circ}$	$ \begin{array}{c} 1/_{2} - 3/_{2} \\ 5/_{2} - 3/_{2} \\ 5/_{2} - 3/_{2} \\ - \\ 5/_{2} - 3/_{2} \end{array} $
3807,29 3800,99 3787,32	10 15 3	14,00 13,97 12,01	17,26 17,23 15,28	$6s' {}^{2}D - 7^{\circ}$ $5d' {}^{2}D - 3^{\circ}$ $5d {}^{4}D - 6p {}^{2}P^{\circ}$	3/2 - 3/2 $5/2 - 7/2$ $1/2 - 3/2$

λ, Å	I	$E_{ m H}^{},{ m eV}$	E _B , eV	Transition	J
3783 ,23 3780 ,70	10 1	13,97 15,28	17,25 18,56	5d' ² D—5° 6p ² P°—6d' ² D	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3778,78 3775,49 3770,12	1 1 3	15,08 13,97	18,36 17,26	6p ⁴ S°—6d′ ² D 5d′ ² D—7°	3/ ₂ —3/ ₂ 5/ ₂ —3/ ₂ —
3763,37 3762,26	15 10	11,79	15,08	6s ⁴ P—6p ⁴ S°	³ / ₂ — ³ / ₂ —
3762 ,05 3756 ,87 3737 ,20	$egin{matrix} 3 \\ 10 \\ 5 \end{bmatrix}$	14,00 13,06	17,29 16,36	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3731 ,20 3731 ,18 3720 ,80	20 40	$\begin{array}{c} -13,14 \\ 12,74 \end{array}$	16,46 16,08	$\frac{5d\ ^{2}P-6p'\ ^{2}P^{\circ}}{6s\ ^{2}P-6p'\ ^{2}P^{\circ}}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3717,20 3715,69 3711,64	$\begin{array}{c} 20 \\ 2 \\ 20 \end{array}$	13,06 15,02 13,86	16,39 18,36 17,20	$5d^{2}P - 6p'^{2}D^{\circ} 6p^{2}S^{\circ} - 6d'^{2}D 6p^{4}P^{\circ} - 20$	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
3691,84 3690,74	1 1	11,91 14,00	15,26 17,36	$\frac{5}{6} \frac{d}{d} D - 6p^2 D^\circ$ $6s'^2 D - 13^\circ$	3/2 - 1/2 $3/2 - 5/2$ $3/2 - 1/2$
$3674,04 \\ 3672,57 \\ 3663,93$	$\begin{array}{c}1\\20\\5\end{array}$	14,09 11,91 14,00	17,47 15,28 17,38	$6p\ ^4P^{\circ}-6d\ ^4P \ 5d\ ^4D-6p\ ^2P^{\circ} \ 6s'\ ^2D-6p''\ ^2P^{\circ}$	$\begin{array}{c} 1/_2 - 1/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 3/_2 \end{array}$
3661 ,70 3658 ,44	20 6	13,86 13,97	17,24 17,36	6 <i>p</i> ⁴ <i>P</i> °—6 <i>d</i> ⁴ <i>F</i> 5 <i>d</i> ′ ² <i>D</i> —15°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3657 ,74 3644 ,91 3644 ,43	5 5 5	12,59 13,06 12,01	15 ,98 16 ,46 15 ,41	5d ⁴ F-6p' ² F° 5d ² P-6p' ² P° 5d ⁴ D-6p ² D°	$\begin{array}{c} 5/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
3634,48 3621,98	1 3	13,97 14,48	17,38 17,90	5d' ² D—6p" ² P° 6p ⁴ D°—6d ² D	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3612,37 $3611,52$ $3607,41$	20 1 8	11,83 13,89 12,01	15,26 17,31 15,44	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 7/_2 - 5/_2 \\ 5/_2 - 3/_2 \\ 1/_2 - 1/_2 \end{array}$
3604,83 3589,88	3 1	13,86	17,31	$6p {}^{4}P^{\circ} - 6d {}^{4}F$	3/ ₂ —3/ ₂
3588,62 3564,30	$\begin{array}{c} 6 \\ 20 \\ 1 \end{array}$	11,83 11,79 14,00	15,28 15,26 17,48	$5d\ ^4D-6p\ ^2P^{\circ}\ 6s\ ^4P-6p\ ^2D^{\circ}\ 6s'\ ^2D-21^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \end{array}$
3562,50 3561,75 3548,69	1 2	15,08 13,80	18,56 17,29	$6p {}^{4}S^{\circ} - 6d' {}^{2}D$ $5d' {}^{2}D - 9^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3546,29 3538,08	$\begin{array}{c}1\\2\\1\end{array}$	11,79 11,91 13,97	15,28 15,41 17,48	$6s\ ^4P-6p\ ^2P^{\circ}\ 5d\ ^4D-6p\ ^2D^{\circ}\ 5d'\ ^2D-21^{\circ}$	$\frac{3}{2} - \frac{3}{2}$ $\frac{3}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{3}{2}$
3534 ,61 3530 ,21 3514 ,58	3 8	13,80	17,31	5 <i>d</i> ′ ² <i>D</i> —11°	$\frac{^{3}/_{2}^{-}-^{5}/_{2}}{-}$
3508,88 3506,56	20 15 1	12,92 12,54 12,59	16,46 16,08 16,12	$6s\ ^{2}P-6p'\ ^{2}P^{\circ}\ 6s\ ^{4}P-6p'\ ^{2}P^{\circ}\ 5d\ ^{4}F-6p'\ ^{2}F^{\circ}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
3504,25 3503,15 3501,77	15 20	11,91	15,44	$5d^{4}D - 6p^{2}P^{\circ}$	$\frac{3}{2} \frac{1}{2}$
3500,36 3485,23	30 1	11,54 13,80	15,08 17,36 17,65	$\frac{6s}{5d'} {}^{2}D - 6p {}^{4}S^{\circ} \\ \frac{5d'}{6p} {}^{4}P^{\circ} - 7s {}^{2}P$	$^{5/2}_{2}$ $^{3/2}_{2}$ $^{3/2}_{1/2}$ $^{1/2}_{2}$ $^{3/2}$
3482 ,21 3474 ,23 3464 ,17	$\begin{array}{c}2\\20\\1\end{array}$	14,09 15,81 13,80	17,38 19,38 17,36	5d' 2P—39° 5d' 2D—17°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{1}{2}$
3462,81 3461,26	1 100 8	14,07 13,80 11,83	17,65 17,38 15,41	$6p\ ^4D^{\circ}-7s\ ^2P \ 5d'\ ^2D-6p''\ ^2P^{\circ} \ 5d\ ^4D-6p\ ^2D^{\circ}$	$\begin{array}{c} 5/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 5/_2 - 3/_2 \end{array}$
3460 ,08 3446 ,34 3440 ,75	$\begin{array}{c} 8 \\ 25 \\ 4 \end{array}$	13,80 —	17,40 —	$5d' {}^{2}D - 19^{\circ} - 19^{\circ}$	$\frac{3}{2} - \frac{3}{2}$ - 59

λ, Â	I	E _H , eV	E_{B} , eV	Transition	J
3437,73 3436,48 3432,49 3420,73 3417,04	3 1 1 40 1	13,86 12,74 11,79 14,09	17,47 16,36 15,41 17,72	$\begin{array}{c} - \\ 6p \ ^4P^{\circ} - 6d \ ^4P \\ 6s \ ^2P - 6p' \ ^2D^{\circ} \\ 6s \ ^4P - 6p \ ^2D^{\circ} \\ 6p \ ^4P^{\circ} - 7s \ ^2P \end{array}$	$\begin{array}{c} - \\ 3/_2 - 1/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 3/_2 \\ 1/_2 - 1/_2 \end{array}$
3413,20 3409,49 3399,37 3395,50 3388,05	6 8 1 3 2	14,76 12,74 13,58 11,79	18,40 — 16,39 17,23 15,44	$5d''^{2}D$ — 31° $-6s^{2}P$ — $6p'^{2}D^{\circ}$ $5d^{2}D$ — 3° $6s^{4}P$ — $6p^{2}P^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3386,30 3384,13 3381,34 3375,46 3373,92	$\begin{array}{c} 2 \\ 40 \\ 1 \\ 3 \\ 2 \end{array}$	14,48 11,27 13,58 13,58	18,14 14,93 17,25 17,26	$6p ^4D^{\circ} - 7s' ^2D$ $5p ^6 ^2S - 6p ^4D^{\circ}$ $5d ^2D - 5^{\circ}$ $5d ^2D - 7^{\circ}$	$\begin{array}{c} 3/2 - 5/2 \\ 1/2 - 1/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2 \\ - \end{array}$
3366,72 3350,44 3347,27 3344,97 3338,80	300 6 3 4 4	14,10 14,76 14,07 12,74	17,78 — 18,47 17,78 16,46	$6p ^4D^{\circ} - 6d ^4P$ - $5d'' ^2D - 33^{\circ}$ $6p ^4D^{\circ} - 6d ^4P$ $6s ^2P - 6p' ^2P^{\circ}$	$ \begin{array}{c} 7/2 - 5/2 \\ - \\ 5/2 - 3/2 \\ 5/2 - 5/2 \\ 3/2 - 1/2 \end{array} $
3327,46 3316,39 3313,48 3311,80 3310,85	15 6 2 2 1	11,54 14,48 — 11,54 14,76	15,26 18,22 — 15,28 18,51	$\begin{array}{c} 6s ^4P - 6p ^2D^{\circ} \\ 6p ^4D^{\circ} - 14^{\circ} \\ - \\ 6s ^4P - 6p ^2P^{\circ} \\ 5d'' ^2D - 35^{\circ} \end{array}$	$ \begin{array}{c} 5/2 - 5/2 \\ 3/2 - 5/2 \\ - 5/2 - 3/2 \\ 5/2 - 5/2 \end{array} $
3310,38 3309,39 3298,72 3281,26 3280,48	3 2 6 42 8	<u>-</u> 11,27 14,09	15,02 17,87	$\begin{array}{c} - \\ 5p^6 {}^2S - 6p {}^2S^\circ \\ 6p {}^4P^\circ - 6d {}^4P \end{array}$	- $1/2$ $1/2$ $1/2$ $3/2$ $-$
3274,94 3272,91 3268,08 3267,34 3267,05	4 60 1 3 6	14,00 13,86 14,76	17,79 17,65 18,56	$6s' ^{2}D - 23^{\circ}$ $6p ^{4}P^{\circ} - 7s ^{2}P$ $5d'' ^{2}D - 37^{\circ}$	$\begin{array}{c}$
3266,08 3262,02 3260,73 3259,36 3250,56	4 2 12 25	13,58 12,32 12,59 11,27	17,38 16,12 16,39 15,08	$\begin{array}{c} - \\ 5d ^2D - 6p'' ^2P^{\circ} \\ 5d ^4F - 6p' ^2F^{\circ} \\ 5d ^4F - 6p' ^2D^{\circ} \\ 5p^{6} ^2S - 6p ^4S^{\circ} \end{array}$	$ \begin{array}{c} - \\ 5/2 - 3/2 \\ 9/2 - 7/2 \\ 5/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
3250,04 3249,35 3247,74 3233,23 3229,03	2 1 6 1 4	{ 12,54 13,97 15,26	16,36 17,79 - 19,10	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} - \\ 1/2 - 3/2 \\ 5/2 - 3/2 \\ - \\ 5/2 - 5/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ $
3225,08 3242,29 3206,72 3202,04 3201,68	15 5 1 10 3	13,39 13,39 13,39 11.54 13,38	17,23 17,25 17,26 15,41 17,25	$6s' {}^{2}D - 3^{\circ}$ $6s' {}^{2}D - 5^{\circ}$ $6s' {}^{2}D - 7^{\circ}$ $6s {}^{4}P - 6p {}^{2}D^{\circ}$ $5d {}^{2}D - 5^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3196,22 3193,75 3181,39 3475,64 3175,25	25 1 3 80 6	14,48 13,58 —	18,36 17,48 —	6p 4D = 6d′ 2D 5d 2D = 21° = = =	$ \begin{array}{c} - \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
3174,59 3168,67 5 92	1 3	13,39 14,09	17,29 18,00	6s' 2D—9° 6p 4P°—6d 2P	$^{5/2}_{1/2}^{-3/2}_{1/2}$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
3165,27 3164,44	6 4	12,54	16,46	6s ⁴ P-6p' ² P°	1/2—1/2 —
3164,23	6	13,38	17,29	5d ² D—9°	3/2-3/2
3162,93 3159,75	$egin{array}{c} 25 \ 4 \end{array}$	13,86 $13,39$	17,78 17,31	6p ⁴ P°—6d ⁴ P 6s′ ² D—11°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$
3148,99	5 4	13,31	17,25	5d 4P—5°	3/2-3/2
$3145,02 \\ 3143,62$	6	13,31	17,26	5d ⁴ P—7°	3/ ₂ —3/ ₂
3130 ,40 3128 ,40	3 1		17,02	5 <i>d</i> ² <i>P</i> —1°	
3124,02	12	15,41	19,38	5d" ² D-39°	$^{3}/_{2}$ — $^{3}/_{2}$
3121 ,87 3116 ,78	$250 \\ 2$	13,39 —	17,36 —	6s' ² D—15°	⁵ / ₂ — ⁵ / ₂
$3112,74 \\ 3107,82$	$\begin{array}{c} 20 \\ 20 \end{array}$	13,31 —	17,29 —	5d ⁴ P—9°	³ / ₂ — ³ / ₂ —
$3104,40 \\ 3102,73$	$\begin{array}{c} 70 \\ 3 \end{array}$	13,39 —	17 <u>,</u> 38 <u> </u>	6s' ² D—6p" ² P°	⁵ / ₂ — ³ / ₂ —
3101,51	50	15,38	19,38	6s" ² S—39°	1/2-3/2
$3098,50 \\ 3098,21$	$\frac{1}{2}$	13,31 14,09	17,31 18,09	5d ⁴ P—11° 6p ⁴ P°—6d ² D	$\frac{3}{2}$ $\frac{-5}{2}$ $\frac{1}{2}$ $\frac{-3}{2}$
3096,90	8	13,38	17,38	$5d$ 2D —17 $^\circ$	$\frac{3}{2}$ $\frac{1}{2}$
3094,53 $3092,41$	$\frac{30}{15}$	$13,38 \\ 13,39$	17,38 17,40	5d ² D-6p" ² P° 6s' ² D-19°	$\frac{3/2}{5/2}$
3090,47	1	13,86	17,87	$6p~^4P$ ° $-6d~^4P$	3/23/2
$3088,92 \\ 3087,34$	3 1	$\frac{-}{11,27}$	$\frac{-}{15,28}$	$5p^{6} {}^{2}S - 6p {}^{2}P^{\circ}$	1/2-3/2
3082,87	$\frac{2}{20}$	$14,07 \\ 13,38$	18,09 17,40	$6p ^4D^{\circ} - 6d ^2D$ $5d ^2D - 19^{\circ}$	$^{5/2}_{2}$ $^{3/2}_{2}$ $^{3/2}_{2}$
3082,62 $3073,17$	2	13,20	17,40	$5d ^4P - 3^{\circ}$	⁵ / ₂ — ⁷ / ₂
3071,39 3067,30	$\begin{array}{c} 6 \\ 30 \end{array}$	$\frac{-}{13,25}$	17,29	5d ⁴ P—9°	$\frac{-}{1/_2-3/_2}$
3066,60	1	14,10	$18,14 \\ 17,25$	$^{6p}_{5d} ^{4D}_{P-5} ^{-7s'}^{2D}$	$\frac{7}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$
3061,54 3056,49	12 20	13,20 13,20	17,25	5d ⁴ P—7°	5/2-3/2
$3050,98 \\ 3048,92$	$\frac{3}{3}$	14,23	18,29	5d′ ² F—25° —	$\frac{5}{2}$ $\frac{-3}{2}$
3048,50	$\frac{3}{2}$	14,23	18,29	5d' ² F—27°	⁵ / ₂ — ⁵ / ₂
3048,17 3047,76	<i>3</i> 8	_	_	_	
3046,27	25	14,23	18,30	$5d'^{2}F-29^{\circ}$	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
$3045,25 \\ 3044,75$	30 10	13,31 11,91	17,38 15,98	$5d$ 4P $-6p''$ $^2P^\circ$ $5d$ 4D $-6p'$ $^2F^\circ$	$\frac{3}{2}$ $\frac{72}{5}$ $\frac{72}{2}$
3042,12	12		_		2/ 5/
3037,35 3036,80	$\begin{array}{c} 6 \\ 30 \end{array}$	14,48 15,41	18,56 19,49	6p ⁴ D°—6d′ ² D 5d″ ² D—41°	$\frac{3}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3033,71	10	13,31	17,40	5d ⁴ P—19°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
3033,11 3027,63	$rac{6}{2}$	14,48	18,57	$6p {}^{4}D^{\circ} - 7s' {}^{2}D$	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
		12,92	17,02 17,29	6s ² P—1° 5d ⁴ P—9°	$\frac{-7_2}{-7_2}$
3027,27 3022,10	3 2	13,20 —		_	- 'Z 'Z -
3020,29 3019,78	$\frac{2}{2}$	13,25	17,36	5d ⁴ P—13°	1/2 ⁻¹ /2
3017,43	100		- 19,49		$\frac{-}{1/_2-^3/_2}$
$3015,52 \\ 3013,82$	$\frac{20}{2}$	13,20	17,31	5d 4P—11°	$\frac{5/2}{1/2}$ $\frac{5/2}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
3012,88	$\begin{array}{c} 1 \\ 2 \end{array}$	13,25	17,25 —	5d ⁴ P—5°	
3006,97 3003,98	40	13,25	17,38	5d ⁴ P—17°	1/ ₂ —1/ ₂

λ, Α	I	E _H , eV	E _B , eV	Transition	J
2999,21	15	_	_	_	
2991,73	3	$\left\{\begin{array}{c} 14,07\\11,27 \end{array}\right.$	18,22 15,41	$^{6p}_{5p^{6}}^{4}D^{\circ}$ —14 $^{5p^{6}}_{2}S$ —6 $^{p}_{2}D^{\circ}$	$\frac{5}{2}$ $\frac{5}{2}$ $\frac{5}{2}$ $\frac{1}{2}$ $\frac{3}{2}$
2990,54 2986,82	12 8	13,25	17,40	5d ⁴ P-19° 5d ⁴ D-6p′ ² F°	$\frac{1/2}{2}$ $\frac{3/2}{5/2}$ $\frac{5/2}{5/2}$
2986,18	10	11 ,83 —	15,98 —	3 <i>a D</i> =0 <i>p</i> - <i>r</i>	——————————————————————————————————————
2982 ,23 2979 ,32	$\begin{array}{c} 2\\300\end{array}$	13,20			- 5/ ₂ 5/ ₂
90, 2977	5	-	_		— /2 —
$2976,39 \ 2974,86$	$\frac{8}{20}$	13,31	17,48	5 <i>d</i> ⁴ <i>P</i> —21°	$\frac{-}{^{3}/_{2}-^{3}/_{2}}$
2972,31	8	91, 11	16,08	$5d$ 4D — $6p'$ $^2P^{\circ}$	$^{3}/_{2}$ — $^{3}/_{2}$
2969,80 2969,23	$\begin{array}{c} 12 \\ 3 \end{array}$		<u> </u>	<u> </u>	<u> </u>
$2966,74 \\ 2964,19$	$\frac{1}{12}$	11,27	15,44 —	$5p^{6} {}^{2}S - 6p {}^{2}P^{\circ}$	1/2—1/2 —
2963,41	50	13,20	17,38	5d ⁴ P—6p" ² P°	⁵ / ₂ — ³ / ₂
$2955,84 \ 2954,78$	$\frac{2}{2}$	_	_	-	<u> </u>
2952,48 2951,58	$rac{2}{2}$	13,20 13,06	$17,40 \\ 17,26$	5d ⁴ P—19° 5d ² P—7°	$\frac{5}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2949 ,77	4	, —		_	
2944,61 2943,41	4 4	_	_		<u> </u>
2942,10 2941,38	$\frac{20}{8}$	_	_	<u> </u>	-
2939,72	5	_	_	_	_
2935 ,86 2934 ,80	$\frac{60}{2}$		17,36	5 <i>d</i> ² <i>P</i> —13°	$\frac{-}{1/2}$
$2933,34 \\ 2927,58$	$\begin{array}{c} 1 \\ 2 \end{array}$	13,25 13,86	17,48 18,09	$^{5d}_{6p} ^{4P} - ^{21}^{\circ}_{6d} ^{2}D$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2924,38	2	13,06	17,29	$5d^{2}P-9^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$
$2923,95 \\ 2923,03$	6 1	$\frac{-}{14,23}$		5d' 2F-33°	5/ ₂ —3/ ₂
2919,87 2910,64	40 1	13,14 13,89	17,38 18,14	5d ² P-17° 6p ⁴ P°-7s′ ² D	$^{1}/_{2}$ — $^{1}/_{2}$
2910,04 $2910,27$	3		—	_	⁵ / ₂ — ⁵ / ₂
2907,18 2905,10	${ 80 \atop 2}$	13,14 14,09	17,40 18,36	5d ² P-19° 6p ⁴ P°-6d′ ² D	$\frac{1}{2}$ $\frac{3}{2}$
2904,18	3	-	_	- 04 D	$\overset{1/_{2}{-}^{3/_{2}}}{-}$
2902 ,68 2895 ,22	3 150	 14,23	— 18,51	 5d' ² F—35°	
2889 ,07 2887 ,12	10 10	11,79	16,08	$6s ^4P$ — $6p' ^2P^{\circ}$	$^{3}/_{2}$ — $^{3}/_{2}$
2883,71	12	11,83 11,83	16,12 16,12	$5d ^4D - 6p' ^2F^{\circ} \ 5d ^4D - 6p' ^2F^{\circ}$	$\frac{7}{2}$ $\frac{7}{2}$ $\frac{7}{2}$ $\frac{5}{2}$ $\frac{-7}{2}$
2881 ,14	1	13,06	17,36	$5d {}^{2}P-13^{\circ}$	$^{3}/_{2}$ — $^{1}/_{2}$
2871 ,24 2867 ,36	$\frac{50}{2}$	13,97	18,30	5d' ² D—29°	$\frac{-}{^{5/2}-^{3/2}}$
2866 ,76 2864 ,73	5 150	13,06 13,06	17,38 17,38	$\frac{5d~^2P-17^{\circ}}{5d~^2P-6p''~^2P^{\circ}}$	$\frac{3}{2}$ _1/2 $\frac{3}{2}$ _3/2
2861,90	20	14,23	18,56	$5d^{\prime\prime} {}^{2}F - 37^{\circ}$	$\frac{5}{2} - \frac{5}{2}$
2856 ,65 2854 ,53	$\frac{2}{60}$	13,06			
2853,11	1	13,14	17,48	$5d^{-1}P - 19$ $5d^{-2}P - 21^{\circ}$	$\frac{3}{2} \frac{3}{2}$ $\frac{1}{2} \frac{3}{2}$
2852 ,39 2850 ,95	$\frac{3}{3}$	12,01	16,36		$\frac{-}{1/2}$
2849,66	8		_		· —
2846,48	3	_		_	_

λ, Å	I	E _H , eV	E _B , eV	Transition	J
2845 ,92 2844 ,45 2839 ,57	8 5 2	_ _ _	_ _ _	_ _ _	<u>-</u>
2838,85 2836,16 2832,46 2832,00 2827,90	3 1 2 2 2	12,92	17,29 — — —	6s ² P_9°	1/2-3/2 - -
2826,94 2820,06 2819,02 2808,56 2807,55	5 4 1 4 2	14,00 13,39 —	18,40 17,79 —	6s' ² D-31° 6s' ² D-23°	3/ ₂ —3/ ₂ 5/ ₂ —3/ ₂ ————————————————————————————————————
2803,02 2802,50 2797,65 2796,49 2792,52	$\begin{array}{c} 5 \\ 1 \\ 30 \\ 2 \\ 1 \end{array}$	13,97 12,59 - 11,54	18,40 17,02 — 15,98	$5d' ^2D - 31^{\circ} \\ 5d ^4F - 1^{\circ} \\ -6s ^4P - 6p' ^2F^{\circ}$	$\begin{array}{c} - \\ \frac{5}{2} - \frac{3}{2} \\ \frac{5}{2} - \frac{3}{2} \\ - \\ \frac{5}{2} - \frac{5}{2} \end{array}$
2789,52 2785,42 2782,73 2774,86 2773,55	$egin{pmatrix} 2 \\ 3 \\ 2 \\ 15 \\ 5 \end{bmatrix}$	11,91 14,00	16,36 18,47	$5d\ ^4D - 6p'\ ^2D^{\circ} \\ - 6s'\ ^2D - 33^{\circ} \\ - $	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2770,41 2767,00 2763,56 2762,77 2758,36	2 1 1 2 1	12,92 14,09 11,91 14,07 13,80	17,40 18,57 16,39 18,56 18,30	$6s\ ^{2}P-19^{\circ}\ 6p\ ^{4}P^{\circ}-7s'\ ^{2}D\ 5d\ ^{4}D-6p'\ ^{2}D^{\circ}\ 6p\ ^{4}D^{\circ}-6d'\ ^{2}D\ 5d'\ ^{2}D-29^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \\ 5/2 - 5/2 \\ 3/2 - 3/2 \end{array} $
2757,86 2744,04 2743,16 2734,14 2733,15	40 2 2 50 25	13,97 — 13,25 13,97	18,47 — 17,79 18,51	$5d' ^{2}D$ — 33° — — $5d ^{4}P$ — 23° $5d' ^{2}D$ — 35°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2731,46 2723,40 2721,28 2718,79 2717,35	1 1 1 1 30	11,54 11,91 12,92 11,83	16,08 16,46 17,48 16,39	6s ⁴ P—6p' ² P° 5d ⁴ D—6p' ² P° 6s ² P—21° 5d ⁴ D—6p' ² D°	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \\ 7/2 - 5/2 \\ - \end{array} $
2715,76 2703,44 2702,34 2702,22 2691,40	$\begin{array}{c} 3 \\ 10 \\ 2 \\ 2 \\ 1 \end{array}$	11,83 13,97 13,20 11,54 11,79	16,39 18,56 17,79 16,12 16,39	$5d ^4D - 6p' ^2D^{\circ}$ $5d' ^2D - 37^{\circ}$ $5d ^4P - 23^{\circ}$ $6s ^4P - 6p' ^2F^{\circ}$ $6s ^4P - 6p' ^2D^{\circ}$	$ \begin{array}{c} 5/2 - 5/2 \\ 5/2 - 5/2 \\ 5/2 - 3/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
2687,03 2686,14 2677,18 2672,22 2668,02	5 3 50 4 5	14,76 12,74 12,59	19,38 17,38 17,23	$5d'' ^{2}D - 39^{\circ}$ $- \\ 6s ^{2}P - 6p'' ^{2}P^{\circ}$ $5d ^{4}F - 3^{\circ}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2663,29 2659,28 2657,00 2655,39 2634,20	$\begin{array}{c} 3 \\ 4 \\ 5 \\ 2 \\ 2 \end{array}$	12,74 12,59 13,80	17,40 17,25 18,47	6s ² P—19° 5d ⁴ F—5° 5d' ² D—33° —	$ \begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ -$
2633,88 2631,25 2630,40 2629,54 2621,39	2 2 6 5 2	13,58 11,27 13,58 —	18,29 15,98 18,30 —	$ \begin{array}{r} 5d \ ^2D - 25^{\circ} \\ 5p^6 \ ^2S - 6p' \ ^2F^{\circ} \\ 5d \ ^2D - 29^{\circ} \\ - \\ - \\ - \\ \end{array} $	5/2—3/2 1/2—5/2 5/2—3/2 —

			\		
λ, Å	I	E _H , eV	E _B , eV	Transition	J
2607,52 2606,93 2605,54	1 5 50	12,54 —	17,29 — —	6s ⁴ P—9°	1/2—3/2 —
2598,42 2597,01	2 4	12,59	17,36	5d ⁴ F—15°	5/ ₂ —5/ ₂
2596,86 2584,88 2576,97 2561,48 2560,89	5 1 15 2 3	12,59 11,27 12,54	17,38 16,08 17,38	$5d\ ^4F-6p\ ''\ ^2P^\circ \ 5p^6\ ^2S-6p'\ ^2P^\circ \ 6s\ ^4P-17^\circ \ -$	$ \begin{array}{c} - \\ 5/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ - \\ - \\ - \\ \end{array} $
2554,20 2551,70	1 3	11,54 12,54	16,39 17,40	6s ⁴ P-6p′ ² D° 6s ⁴ P-19°	$^{5/2}_{1/2}$ $^{5/2}_{1/2}$
$2546,37 \ 2538,02 \ 2531,36$	$\frac{3}{3}$	13,58	18,47	5d ² D=33°	5/ ₂ —3/ ₂
2530 ,18 2528 ,49 2526 ,98 2526 ,79	$\begin{array}{c} 2 \\ 6 \\ 12 \\ 12 \end{array}$	13,39 13,39 13,39	18,29 18,29 18,30	6s' ² D—25° 6s' ² D—27° 6s' ² D—29°	$\begin{array}{c} \frac{5}{2} - \frac{3}{2} \\ \frac{5}{2} - \frac{5}{2} \\ \frac{5}{2} - \frac{3}{2} \\ \end{array}$
$25\overline{24},46$ $2519,17$	$\frac{1}{3}$	12.32	17,23	5d ⁴ F3°	9/27/2
2516,112 2514,29 2506,86 2491,78	12 5 8 5				$\frac{-}{-}$ $\frac{-}{-}$ $\frac{5}{2}$
2490,76 2489,11	20 50	13,31 13,31	18,29 18,29	5d ⁴ P—25° 5d ⁴ P—27°	$\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
2478 ,82 2475 ,89 2470 ,18	$\begin{array}{c} 4\\100\\5\end{array}$			 5d ² D31°	${}^{3}/_{2}$
2469 ,46 2468 ,43	5 5	<u>-</u>	<u>-</u>	Ξ	- - -
2466,60 2444,40 2441,60	$\begin{array}{c}2\\2\\2\end{array}$	$\frac{-}{13,39}$	_ 		- - ⁵ / ₂ ³ / ₂
2438,76 2435,47 2432,72 2425,05 2422,94	1 6 12 40 10	13,31 13,38 13,20 —	18,40 18,47 18,30 —	5d ⁴ P-31° 5d ² D-33° 5d ⁴ P-29°	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\$
2422,12 2421,27	$\frac{2}{20}$	43,39 —	18,51 —	6s' ² D—35°	⁵ / ₂ — ⁵ / ₂
2410 ,72 2409 ,74	$\begin{array}{c} 7 \\ 40 \end{array}$	13,25	18,40	5d ⁴ P-31° - 5d' ² F-39°	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$
2405,92 2401,79	3 2	14,23 13,14	19,38 18,30	$5d~^2P$ — 29°	$\frac{5}{2} - \frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$ $\frac{5}{2} - \frac{5}{2}$
2398,76 2392,33 2392,45 2387,75	4 2 2 4	13,39 — — 11,27	18,56 — — 16,46	$\frac{6s'}{2}D - 37^{\circ}$ $-\frac{1}{5p^{6}}$ $\frac{2S - 6p'}{2}P^{\circ}$	- _
2386,14 2385,85	2	13,20	18,40	5d 4P-31°	1/2—1/2 — 5/ 3/
2369,62 2368,68 2362,50	4 5 1	11,79 12,54	17,02 17,79	6s ⁴ P-1° 6s ⁴ P-23°	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
2356,72 2356,25 2353,52	4 1 1	13,14 13,20	18,40 18,47		$ \begin{array}{c} - \\ 1/_2 - 3/_2 \\ 5/_2 - 3/_2 \end{array} $

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
2351,56 2351,18	4	_	_		_ _
2344,47	12	12,01	17,29	$5d ^4D - 9^{\circ}$	$^{1}/_{2}$ — $^{3}/_{2}$
2342,18 2335,42 2319,70 2316,80	$\frac{3}{2}$ 7 10	13,20 11,91 11,91	18,51 17,25 17,26	$5d ^4P - 35^{\circ}$ $5d ^4D - 5^{\circ}$ $5d ^4D - 7^{\circ}$	$\begin{array}{c} - \\ 5/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
2313,70 2307,28 2304,60 2299,98 2299,36	5 3 1 6 2	13,20 12,01 14,00 11,91 12,01	18,56 17,38 19,38 17,29 17,40	$5d\ ^{4}P$ -37° $5d\ ^{4}D$ -17° $6s'\ ^{2}D$ -39° $5d\ ^{4}D$ -9° $5d\ ^{4}D$ -19°	$\begin{array}{c} 5/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array}$
2296,52 2294,57 2292,40 2290,84 2285,94	30 15 20 2 8	11,83 11,83 13,06 11,83	 17,23 17,23 18,47 17,25	$ \begin{array}{c} -\\ 5d ^4D - 3^{\circ} \\ 5d ^4D - 3^{\circ} \\ 5d ^2P - 33^{\circ} \\ 5d ^4D - 5^{\circ} \end{array} $	$ \begin{array}{c}$
2285,24 2268,72 2266,80 2265,94 2265,62	2 1 3 2 3	 11,79 11,83 11,79 12,92	17,25 17,29 17,26 18,40	$6s ^{4}P - 5^{\circ}$ $5d ^{4}D - 9^{\circ}$ $6s ^{4}P - 7^{\circ}$ $6s ^{2}P - 31^{\circ}$	$\begin{array}{c} - \\ 3/2 - 3/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 3/2 \end{array}$
2264,20 2262,95 2259,22 2256,56 2249,86	2 2 1 1 4	11,91 11,91 11,83 11,91 11,79	17,38 17,38 17,31 17,40 17,29	$5d ^4D - 17^{\circ}$ $5d ^4D - 6p'' ^2P^{\circ}$ $5d ^4D - 11^{\circ}$ $5d ^4D - 19^{\circ}$ $6s ^4P - 9^{\circ}$	3/2 - 1/2 $3/2 - 3/2$ $5/2 - 5/2$ $3/2 - 3/2$ $3/2 - 3/2$
$2241,86 \ 2230,79 \ 1972,6$	$\begin{array}{c}2\\1\\5\end{array}$	11 ,83 11 ,83	17,36 17,38	5d ⁴ D—15° 5d ⁴ D—6p″ ² P° —	$^{7/_{2}^{5}/_{2}}_{^{5/_{2}^{3}/_{2}}}$
1244,756 1183,053	5 7	1,31 1,31	11,27 $11,79$	$5p^{5} {}^{2}P^{\circ} - 5p^{6} {}^{2}S 5p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$	$^{1}/_{2}$ _ $^{1}/_{2}$ $^{1}/_{2}$ _ $^{3}/_{2}$
1169,63	2 5	1,31	11,91	$5p^{5} {}^{2}P^{\circ} - 5d {}^{4}P$	1/2-3/2
$1158,474 \\ 1100,432$	5 10	$^{1,31}_{0,00}$	$12,01 \\ 11,27$	$5p^{5} {}^{2}P^{\circ} - 5d {}^{4}P 5p^{5} {}^{2}P^{\circ} - 5p^{6} {}^{2}S$	$\frac{1}{2}$ _1/2 $\frac{1}{2}$ /2 $\frac{1}{2}$
1083,860 1074,476	5 15	$^{1,31}_{0,00}$	12,74 11,54	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{3}{2}$ $\frac{5}{2}$
1051,920	10	0,00	11,79	$5p^{5} {}^{2}P^{\circ} - 6s {}^{4}P$	3/2-3/2
$1048,272 \\ 1041,306$	8 9	$00,00 \\ 00,0$	11,83 11,91	$5p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$ $5p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$	$\frac{3}{2} - \frac{5}{2}$ $\frac{3}{2} - \frac{3}{2}$
1037,680 1032,438	6 4	1,31 0,00	$13,25 \\ 12,01$	$5p^{5} {}^{2}P^{\circ} - 5d {}^{4}P 5p^{5} {}^{2}P^{\circ} - 5d {}^{4}D$	$\frac{1}{2}$ _1/2 3/2_1/2
976,678	6	1,31	14,00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/2—3/ ₂
$972,769 \\ 971,84$	$\frac{7}{3}$	0,00	12,74 —	5p° 2P' = 0s 2P	³ / ₂ — ³ / ₂
$939,16 \\ 935,405$	$\frac{12}{2}$	0,00	$\frac{-}{13,25}$	$_{5p^{5}}^{2}P^{\circ}{5d}^{4}P$	$\frac{-}{3/_2-^1/_2}$
931,25 925,866	$\begin{array}{c} 10 \\ 5 \end{array}$	0,00		$5p^{5} {}^{2}P^{\circ} - 6s' {}^{2}D$	3/ ₂ —5/ ₂
912,71	8	_	-	——————————————————————————————————————	
$887,24 \\ 885,54$	$\frac{6}{3}$	0,00	14,00	$5p^{5} {}^{2}P^{\circ} - 6s' {}^{2}D$	3/2 -3/2
880,802 871,42	5 6	1,31	15,38 —	$5p^{5} {}^{2}P^{\circ} - 6s'' {}^{2}S$	1/ ₂ —1/ ₂
854,71	6		_	_	<u> </u>
$805,95 \\ 804,45$	5 5	_	_	-	
$803,066 \\ 787,31$	$\frac{3}{6}$	1,31	16,74 —	$5p^{5} {}^{2}P^{\circ} - 7s {}^{4}P$	1/ ₂ _1/ ₂
740,406	$\ddot{3}$	00,00	16,74	$5p^{5} {}^{2}P^{\circ} - 7s {}^{4}P$	3/2-1/2

Xe III, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{1_0} 4s^2 4p^6 4d^{1_0} 5s^2 5p^{4/3}P_2$ Ionization potential 259 089 cm⁻¹; 32,121 eV

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
7653,8	1	19,70	21,32	$5d'' 23^{\circ} - 6p' {}^{1}D$	2—2
7460,82	5	17,19	18,85	$6s' {}^{3}D^{\circ} - 6p {}^{3}P$	3—2
7448,9	1	20,06	21,72	$5d'' 27^{\circ} - 6p'' {}^{3}D$	2—1
7298,93	1	18,01	19,71	$5d' {}^{1}D^{\circ} - 6p' {}^{3}D$	2—1
7185,92	2	17,13	18,85	$5d' {}^{3}D^{\circ} - 6p {}^{3}P$	1—2
7174,90	2	16,91	18,61	5d' 41°-6p 3P	2-1
7049,34	2	18,40	20,16	5d" 17°-6p' 3F	3-3
7043,94	4	19,08	20,84	6s" 3P°-6p' 3P	2-1
6818,12	1	17,13	18,94	5d' 3D°-6p 3P	1-0
6371,65	1	16,91	18,85	5d' 41°-6p 3P	2-2
6268,30	2	17,73	19,71	$6s' {}^{1}D^{\circ} - 6p' {}^{3}D$ $5d'' 19^{\circ} - 6p' {}^{3}D$ $5d'' 17^{\circ} - 6p' {}^{1}F$ $5d'' 15^{\circ} - 6p' {}^{1}F$ $6s {}^{3}D^{\circ} - 6p {}^{3}P$	2—1
6260,46	2	18,65	20,63		2—3
6238,24	60	18,40	20,39		3—3
6221,66	25	18,39	20,39		2—3
5857,61	10	16,52	18,63		1—1
5780,55	2	18,01	20,16	$5d' ^{1}D^{\circ} - 6p' ^{3}F$ $6s'' ^{1}P^{\circ} - 6p' ^{1}D$ $6s' ^{3}D^{\circ} - 6p ^{3}P$ $5d' ^{3}D^{\circ} - 6p' ^{3}F$ $6s' ^{1}D^{\circ} - 6p' ^{3}F$	2-3
5761,96	2	19,17	21,32		1-2
5748,71	12	16,70	18,85		2-2
5701,31	6	17,75	19,92		3-2
5666,46	1	17,73	19,92		2-2
5566,02	2	18,40	20,63	$5d'' 17^{\circ} - 6p' ^{3}D$	3-3
5552,83	12	18,39	20,63	$5d'' 15^{\circ} - 6p' ^{3}D$	2-3
5524,39	40	19,08	21,32	$6s'' P^{\circ} - 6p' ^{1}D$	2-2
5510,55	1	18,40	20,65	$5d'' 17^{\circ} - 6p' ^{3}F$	3-4
5454,30	1	20,40	22,67	$6p' 4 - 6d ^{5}D^{\circ}$	1-0
5413,56	12	18,40	20,69	$5d'' \ 17^{\circ} - 6p' \ ^{3}P$	3-2 $ 2-2 $ $ 1-2 $ $ 2-2 $ $ 2-2$
5401,04	50	18,39	20,69	$5d'' \ 15^{\circ} - 6p' \ ^{3}P$	
5384,17	2	19,76	22,06	$5d'' \ 25^{\circ} - 6p'' \ ^{3}D$	
5371,09	1	15,91	18,22	$5d' \ ^{3}F^{\circ} - 6p \ ^{5}P$	
5367,06	30	17,61	19,92	$5d' \ ^{3}D^{\circ} - 6p' \ ^{3}F$	
5310,99	$\begin{array}{c} 6 \\ 60 \\ 3 \\ 20 \\ 4 \end{array}$	16,52	18,85	$6s' ^3D^{\circ} - 6p ^3P$	1-2
5238,95		18,32	20,69	$5d'' 13^{\circ} - 6p' ^3P$	1-2
5233,16		17,75	20,12	$5d' ^3D^{\circ} - 6p' ^3F$	3-2
5223,66		18,01	20,39	$5d' ^1D^{\circ} - 6p' ^1F$	2-3
5143,03		17,75	20,16	$5d' ^3D^{\circ} - 6p' ^3F$	3-3
5114,57	1	17,73	20,16	6s' ¹ D° — 6p' ³ F	2—3
5107,38	20	16,52	18,94	6s' ³ D° — 6p ³ P	1—0
5070,53	1	18,39	20,84	5d" 15° — 6p' ³ P	2—1
5008,55	10	17,45	19,92	5d' ³ S° — 6p' ³ F	1—2
4927,53	3	18,32	20,84	5d" 13° — 6p' ³ P	1—1
4869 ,47	40	17,61	20,46	$5d' \ ^3D^{\circ} - 6p' \ ^3F$	2-3
4794 ,48	12	17,13	19,71	$5d' \ ^3D^{\circ} - 6p' \ ^3D$	1-1
4743 ,89	4	18,01	20,63	$5d' \ ^1D^{\circ} - 6p' \ ^3D$	2-3
4723 ,57	30	15,57	18,20	$6s \ ^3S^{\circ} - 6p \ ^5P$	1-1
4697 ,49	2	17,75	20,39	$5d' \ ^3D^{\circ} - 6p' \ ^1F$	3-3
4685,17	1	19,08	21,72	$6s'' \ ^{3}P^{\circ} - 6p'' \ ^{3}D$	2-1
4683,53	60	15,57	18,22	$6s'' \ ^{3}S^{\circ} - 6p' \ ^{5}P$	1-2
4673,66	30	17,73	20,39	$6s' \ ^{1}D^{\circ} - 6p' \ ^{1}F$	2-3
4657,78	9	17,73	20,40	$6s' \ ^{1}D^{\circ} - 6p' \ ^{1}P$	2-1
4643,63	1	17,45	20,12	$5d' \ ^{3}S^{\circ} - 6p' \ ^{3}D$	1-2
4632,68	2	18,01	20,69	5d' ¹ D°—6p' ³ P	2—2
4631,50	2	18,65	21,32	5d" 19°—6p' ¹ D	2—2
4537,33	30	17,19	19,92	6s' ³ D°—6p' ³ F	3—2
4525,67	1	15,46	18,20	5d ³ D°—6p ⁵ P	2—1
4503,46	10	20,06	22,81	5d" 27°—6p" 32	2—1
508					

598

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
4488,81	2	15,46	18,22	$5d\ ^3D^{\circ}-6p\ ^5P$	2-2
4468,15	1	17,61	20,39	$5d'\ ^3D^{\circ}-6p'\ ^1F$	2-3
4453,61	8	17,61	20,40	$5d'\ ^3D^{\circ}-6p'\ ^4$	2-1
4434,16	50	17,13	19,92	$5d'\ ^3D^{\circ}-6p'\ ^3F$	1-2
4425,25	1	21,57	24,37	$6p\ ^3D-35^{\circ}$	3-2, 3
4417,81	1	16,91	19,71	$5d' 41^{\circ} - 6p' ^{3}D$	2—1
4395,12	4	19,76	22,58	$5d'' 25^{\circ} - 6p'' 28$	1—1
4387,52	4	18,01	20,84	$5d' ^{1}D^{\circ} - 6p' ^{3}P$	2—1
4357,66	1	15,64	18,48	$5d' ^{3}F - 6p ^{5}P$	3—3
4309,33	6	17,75	20,62	$5d' ^{3}D^{\circ} - 4f' 6$	3—4
4308,00	10	19,70	22,58	$5d'' 23^{\circ} - 6p'' 28$	2—1
4305,86	2	17,75	20,63	$5d ^{3}D^{\circ} - 6p' ^{3}D$	3—3
4285,89	30	17,73	20,63	$6s' ^{1}D^{\circ} - 6p' ^{3}D$	2—3
4274,13	1	19,17	22,07	$6s' ^{1}P^{\circ} - 6p'' 26$	1—1
4272,60	20	17,75	20,65	$5d' ^{3}D^{\circ} - 6p' ^{3}F$	3—4
4240,24	10	18,40	21,32	$5d'' 17^{\circ} - 6p' 1D$ $6s' 3D^{\circ} - 6p' 3D$ $5d'' 15^{\circ} - 6p' 1D$ $5d' 3F^{\circ} - 6p 3P$ $5d' 3D^{\circ} - 6p' 3P$	3-2
4235,82	1	17,19	20,42		3-2
4232,66	1	18,39	21,32		2-2
4216,75	10	15,91	18,85		2-2
4214,04	20	17,75	20,69		3-2
4209,62 4203,92 4194,88 4176,53 4167,66	10 10 5 20 1	18,78 $17,45$ $19,76$ $17,73$ $17,19$ $21,32$	21,72 20,40 22,72 20,69 20,16 24,30	$6s'' \ ^3P^{\circ} - 6p'' \ ^3D$ $5d' \ ^3S^{\circ} - 6p' \ ^4$ $5d'' \ ^25^{\circ} - 6p'' \ ^3P^{\circ}$ $6s' \ ^1D^{\circ} - 6p' \ ^3F$ $6p' \ ^1D - 31^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 1 - 1 \\ 1 - 0 \\ 2 - 2 \\ 3 - 3 \\ 2 - 2 \end{array} $
4154,65 4152,03 4145,73 4142,01 4132,42	$\begin{array}{c} 2 \\ 5 \\ 100 \\ 10 \\ 3 \end{array}$	19,08 20,06 17,13 19,08 18,32	22,06 23,05 20,12 22,07 21,32	$6s'' ^{3}P^{\circ} - 6p'' ^{3}D$ $5d'' ^{2}7^{\circ} - 6p'' ^{3}6$ $5d' ^{3}D^{\circ} - 6p' ^{3}D$ $6s'' ^{3}P^{\circ} - 6p'' ^{2}6$ $5d'' ^{1}3^{\circ} - 6p' ^{1}D$	$\begin{array}{c} 2-2 \\ 2-1 \\ 1-2 \\ 2-1 \\ 1-2 \end{array}$
4112,34	$ \begin{array}{c} 1 \\ 10 \\ 100 \\ 2 \\ 60 \end{array} $	17,61	20,63	5d' 3D°-6p" 8	2-3
4110,06		16,91	19,92	5d' 41°-6p' 3F	2-2
4109,07		16,70	19,71	6s' 3D°-6p' 3D	2-1
4060,88		21,32	24,38	6p' 1D-37°	2-2, 3
4060,43		19,76	22,81	5d" 25°-6p" 32	1-1
4050,05	200	15,57	18,63	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1
4043,21	20	18,66	21,72		0-1
4028,58	10	17,61	20,69		2-2
4021,62	4	15,12	18,20		1-1
3992,85	20	17,73	20,84		2-1
3985,96	8	19,70	22,81	$5d'' 23^{\circ} - 6p'' 32$	2-1
3969,91	4	19,76	22,88	$5d'' 25^{\circ} - 6p'' 34$	1-1
3950,56	300	15,06	18,20	$6s {}^{5}S^{\circ} - 6p {}^{5}P$	2-1
3922,53	500	15,06	18,22	$6s {}^{5}S^{\circ} - 6p {}^{5}P$	2-2
3915,30	4	18,40	21,57	$5d'' 17^{\circ} - 6p'' {}^{3}D$	3-3
3903,70	4	15,46	18,63	$5d \ ^{3}D^{\circ} - 6p \ ^{3}P$	2—1
3880,46	60	16,52	19,71	$6s' \ ^{3}D^{\circ} - 6p' \ ^{3}D$	1—1
3877,80	200	17,19	20,39	$6s' \ ^{3}D^{\circ} - 6p' \ ^{1}F$	3—3
3861,05	10	16,91	20,12	$5d' \ ^{4}1^{\circ} - 6p' \ ^{3}D$	2—2
3854,30	10	15,64	18,85	$5d' \ ^{3}F^{\circ} - 6p \ ^{3}P$	3—2
3841,88	20	17,61	20,84	$5d' ^3D^{\circ} - 6p' ^3P$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 3-3 \\ 1-1 \\ 1-2 \end{array} $
3841,52	100	16,70	19,92	$6s' ^3D^{\circ} - 6p' ^3F$	
3829,77	20	21,57	24,80	$6p'' ^3D - 39^{\circ}$	
3791,67	12	17,13	20,40	$5d' ^3D^{\circ} - 6p' 4$	
3780,98	300	15,57	18,85	$6s ^3S^{\circ} - 6p ^3P$	
3776,30 3772,53	40 20	18,78 $19,76$	$22,06 \\ 23,05$	6s" ³ P°—6p" ³ D 5d" 25°—6p" 36	1-2 1-1, 2

λ, Λ	I	E _H , eV	E _B , eV	Transition	J
3765,85 3745,72 3708,15	$\frac{10}{25}$	18,78 18,01 19,70	22,07 21,32 23,05	6s" ³ P°-6p" 26 5d' ¹ D°-6p' ¹ D 5d" 23°-6p" 36	$ \begin{array}{c} 1-1 \\ 2-2 \\ 2-1, 2 \end{array} $
3676,63 3654,63 3653,12 3644,14 3641,00	50 20 3 5 15	15,57 17,45 15,46 18,32 16,52	18,94 20,84 18,85 21,72 19,92	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 1-1 2-2 1-1 1-2
3636,03 3632,14 3628,57 3624,05 3623,13	$\begin{array}{c} 3 \\ 20 \\ 3 \\ 600 \\ 40 \end{array}$	19,17 18,66 18,65 15,06 16,70	22,58 22,07 22,06 48,48 20,12	$6s'' ^{1}P^{\circ} - 6p'' ^{2}8$ $6s'' ^{3}P^{\circ} - 6p'' ^{2}6$ $5d'' ^{1}9^{\circ} - 6p'' ^{3}D$ $6s ^{5}S^{\circ} - 6p ^{5}P$ $6s' ^{3}D^{\circ} - 6p' ^{3}D$	$ \begin{array}{r} 1 - 1 \\ 0 - 1 \\ 2 - 2 \\ 2 - 3 \\ 2 - 2 \end{array} $
3618,90 3609,44 3607,01 3601,89 3592,00	$\begin{array}{c} 4 \\ 20 \\ 40 \\ 6 \\ 5 \end{array}$	18,65 17,19 17,19 14,76 15,03	22,07 20,62 20,63 18,20 18,48	$5d$ " 49° — $6p$ " 26 $6s$ ' $^{3}D^{\circ}$ — $4f$ ' 6 $6s$ ' $^{3}D^{\circ}$ — $6p$ ' ^{3}D $5p^{5}$ $^{1}P^{\circ}$ — $6p$ ^{5}P $5d$ $^{3}D^{\circ}$ — $6p$ ^{5}P	2-1 3-4 3-3 1-1 3-3
3583,64 3579,69 3561,38 3552,13 3542,33	80 100 40 50 50	17,19 16,70 16,91 16,91 17,19	20,65 $20,16$ $20,39$ $20,40$ $20,69$	$6s' \ ^3D^{\circ} - 6p' \ ^3F$ $6s' \ ^3D^{\circ} - 6p' \ ^3F$ $5d' \ ^41^{\circ} - 6p' \ ^1F$ $5d' \ ^41^{\circ} - 6p' \ ^4$ $6s' \ ^3D^{\circ} - 6p' \ ^3P$	3-4 2-3 2-3 2-1 3-2
3539,96 3522,83 3497,89 3479,11 3468,19	20 80 4 1 40	19,08 15,12 19,17 17,13 15,06	22,58 18,63 22,72 20,69 18,63	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 1-0 \\ 1-2 \\ 2-1 \end{array} $
3467,20 3454,25 3444,23 3435,78 3403,89	25 70 60 4 8	17,75 17,73 16,52 20,69 19,17	21,32 21,32 20,12 24,30 22,81	$5d' \ ^{3}D^{\circ} - 6p' \ ^{1}D$ $6s' \ ^{1}D^{\circ} - 6p' \ ^{1}D$ $6s' \ ^{3}D^{\circ} - 6p' \ ^{3}D$ $6p' \ ^{3}P - 31^{\circ}$ $6s'' \ ^{1}P^{\circ} - 6p'' \ 32$	3-2 2-2 1-2 2-2 1-1
3379,02 3377,09 3370,65 3362,81 3357,98	5 2 4 3 30	18,39 20,63 18,39 20,69 16,70	22,06 24,30 22,07 24,38 20,39	$5d'' 15^{\circ} - 6p'' ^{3}D$ $6p' ^{\circ}D - 31^{\circ}$ $5d'' 15^{\circ} - 6p'' 26$ $6p' ^{3}P - 37^{\circ}$ $6s' ^{3}D^{\circ} - 6p' ^{1}F$	$\begin{array}{c} 2-2 \\ 3-2 \\ 2-1 \\ 2-2, \ 3 \\ 2-3 \end{array}$
3349,76 3344,97 3340,06 3338,98 3334,26	12 4 10 25 1	$16,70 \\ 20,63 \\ 19,17 \\ 18,01 \\ 17,13 \\ 20,65$	20,40 24,33 22,88 21,72 20,84 24,37	$6s' ^3D^{\circ} - 6p' ^4$ $6p' ^3D - 33^{\circ}$ $6s'' ^1P^{\circ} - 6p'' ^34$ $5d' ^1D^{\circ} - 6p'' ^3D$ $5d' ^3D^{\circ} - 6p' ^3P$ $6p' ^3F - 35^{\circ}$	2-1 3-2, 3 1-1 2-1 1-1 4-3
3331,65 3319,53 3317,44 3314,87 3314,30	40 2 2 10 1	16,91 19,08 15,12 18,32 20,63	20,63 22,81 18,85 22,06 24,37	$5d' 41^{\circ} - 6p' ^{3}D$ $6s'' ^{3}P^{\circ} - 6p'' 32$ $5d ^{3}D^{\circ} - 6p ^{3}P$ $5d'' 13^{\circ} - 6p'' ^{3}D$ $6p' ^{3}D - 35^{\circ}$	2-3 2-1 1-2 1-2 3-2, 3
3306,80 3301,60 3287,92 3285,89 3284,70 3278,48 3276,39	10 20 30 10 3 8	18,32 18,85 18,85 18,85 16,38 18,85	22,07 22,61 22,62 22,62 20,16 22,63 20,69	$5d'' 13^{\circ} - 6p'' 26$ $6p ^{3}P - 7s ^{5}S^{\circ}$ $6p ^{3}P - 6d ^{5}D^{\circ}$ $6p ^{3}P - 6d ^{5}D^{\circ}$ $5d' ^{3}G - 6p' ^{3}F$ $6p ^{3}P - 6d ^{5}D^{\circ}$	1-1 2-2 2-3 2-2 4-3 2-1
3268,96 3268,84 3242,86	8 80 10 100	16,91 15,06 17,75 15,03	20,69 18,85 21,57 18,85	$5d' 41^{\circ} - 6p' ^{3}P$ $6s ^{5}S^{\circ} - 6p ^{3}P$ $5d' ^{3}D^{\circ} - 6p'' ^{3}D$ $5d ^{3}D^{\circ} - 6p ^{3}P$	$ \begin{array}{r} 2-2 \\ 2-2 \\ 3-3 \\ 3-2 \end{array} $

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
3236,84	25	15,12	18,94	$5d \ ^{3}D^{\circ}$ - $6p \ ^{3}P$	1-0
3199,22	4	19,17	23,05	$6s'' \ ^{1}P^{\circ}$ - $6p'' \ 36$	1-1, 2
3196,51	25	14,76	18,63	$5p^{5} \ ^{1}P^{\circ}$ - $6p \ ^{3}P$	1-1
3185,24	40	20,40	24,29	$6p' \ ^{4}$ - 29°	1-2
3177,19	5	20,40	24,30	$6p' \ ^{4}$ - 31°	1-2
3169,82	5	20,39	24,30	$6p' ^{1}F - 31^{\circ}$	3-2
3160,70	2	18,66	22,58	$6s'' ^{3}P^{\circ} - 6p'' 28$	0-1
3152,98	8	16,70	20,63	$6s' ^{3}D^{\circ} - 6p' ^{3}D$	2-3
3151,82	10	16,91	20,84	$5d' 41^{\circ} - 6p' ^{3}P$	2-1
3150,69	20	18,65	22,58	$5d'' 19^{\circ} - 6p'' 28$	2-1
3124,61	1	19,08	23,05	$6s'' \ ^{3}P^{\circ} - 6p'' \ 36$	2-1, 2
3114,46	12	20,39	24,37	$6p' \ ^{1}F - 35^{\circ}$	3-2, 3
3106,33	30	17,73	21,72	$6s' \ ^{1}D^{\circ} - 6p'' \ ^{3}D$	2-1
3103,47	3	16,70	20,69	$6s' \ ^{3}D^{\circ} - 6p' \ ^{3}P$	2-2
3099,91	8	18,63	22,63	$6p \ ^{3}P - 6d \ ^{5}D^{\circ}$	1-1
3091,06	50	15,91	19,92	5d' 3F°—6p' 3F	2-2
3083,54	40	16,14	20,16	5d' 3G°—6p' 3F	3-3
3073,49	10	18,78	22,81	6s" 3P°—6p" 32	1-1
3054,49	15	18,01	22,07	5d' 1D°—6p" 26	2-1
3026,52	8	14,76	18,85	5p ⁵ 1P°—6p 3P	1-2
3023,80 3014,18 3004,32 3001,85 2994,69	100 6 30 10 8	{ 16,52 18,48 17,61 18,48 20,16 20,16	20,62 22,58 21,72 22,61 24,29 24,30	$6s' \ ^3D^{\circ} - 6p' \ ^3P$ $6p \ ^5P - 6d \ ^5D^{\circ}$ $5d' \ ^3D^{\circ} - 6p'' \ ^3D$ $6p \ ^5P - 7s \ ^5S^{\circ}$ $6p' \ ^3F - 29^{\circ}$ $6p' \ ^3F - 31^{\circ}$	1-0 3-4 2-1 3-2 3-2 3-2
2992,91	40	18,48	22,62	6p ⁵ P-6d ⁵ D°	3—3
2991,45	8	16,70	20,84	6s' ³ D°-6p' ³ P	2—1
2991,25	10	18,48	22,62	6p ⁵ P-6d ⁵ D°	3—2
2984,63	15	20,65	24,80	6p' ³ F-39°	4—3
2971,24	8	16,52	20,69	6s' ³ D°-6p' ³ P	1—2
2969,45	4	20,16	24,33	$6p' \ ^{3}F - 33^{\circ}$ $6p' \ ^{3}D - 39^{\circ}$ $4f' \ 6 - 39^{\circ}$ $6p' \ ^{3}D - 31^{\circ}$ $5d' \ ^{3}F - 6p' \ ^{3}D$	3-2, 3
2968,56	10	20,63	24,80		3-3
2966,97	10	20,62	24,80		4-3
2964,98	15	20,12	24,30		2-2
2948,06	40	15,91	20,12		2-2
2947,53	40	16,42	20,62	5d' ¹ G°-4f' 6	4-4
2945,25	60	20,16	24,37	6p' ³ F-35°	3-2, 3
2940,22	40	20,12	24,33	6p' ³ D-33°	2-2, 3
2939,13	10	20,16	24,38	6p' ³ F-37°	3-2, 3
2932,74	25	13,97	18,24	5d ⁵ D°-6p ⁵ P	0-1
2930,29	20	16,42	20,65	5d' 1G°—6p' 3F	4-4
2923,51	25	16,38	20,62	5d' 3G°—4f' 6	4-4
2917,59	20	16,14	20,39	5d' 3G°—6p' 1F	3-3
2914,12	20	15,46	19,71	5d 3D°—6p' 3D	2-1
2911,90	40	13,94	18,20	5d 5D°—6p 5P	1-1
2911,47 $2906,56$ $2899,57$ $2897,69$ $2896,63$	50 1 2 30	18,32 16,38 15,84 17,45 13,94	22,58 20,65 20,12 21,72 18,22	$3d'' \ 13^{\circ} - 6p'' \ 28$ $5d' \ ^{3}G^{\circ} - 6p' \ ^{3}F$ $5d' \ ^{1}F^{\circ} - 6p' \ ^{3}D$ $5d' \ ^{3}S^{\circ} - 6p \ ^{3}D$ $5d \ ^{5}D^{\circ} - 6p \ ^{5}P$	1-1 4-4 3-2 1-1 1-2
2891,71	25	15,64	19,92	$5d' \ ^3F^{\circ} - 6p' \ ^3F$	3-2
2872,73	2	17,75	22,06	$5d' \ ^3D^{\circ} - 6p'' \ ^3D$	3-2
2871,68	30	15,84	20,16	$5d' \ ^1F^{\circ} - 6p' \ ^3F$	3-3
2868,42	1	16,52	20,84	$6s' \ ^3D^{\circ} - 6p' \ ^3P$	1-1
2863,86	1	17,73	22,06	$6s' \ ^1D^{\circ} - 6p'' \ ^3D$	2-2
2862 ,41	30	13,87	18,20	5 <i>d</i> ⁵ <i>D</i> °—6 <i>p</i> ⁵ <i>P</i> 6 <i>s'</i> ¹ <i>D</i> °—6 <i>p"</i> 26	2—1
2857 ,81	1	17,73	22,07		2—1

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λ, Α	I	$E_{ m H}^{},~{ m eV}$	$E_{\mathrm{B}},\;\mathrm{eV}$	Transition	J
2850,25 2847,66 2839,57 2838,85 2833,18 2832,95 2827,45 2826,05	2 40 2 3 6 6 6 30 20	15,57 13,87 19,92 18,94 19,92 17,19 13,84 18,22	19,92 18,22 24,29 23,31 24,30 21,57 18,22 22,61	$6s {}^{3}S^{\circ} - 6p' {}^{3}F$ $5d {}^{5}D^{\circ} - 6p {}^{5}P$ $6p' {}^{3}F - 29^{\circ}$ $6p {}^{3}P - 7s {}^{3}S^{\circ}$ $6p' {}^{3}F - 31^{\circ}$ $6s' {}^{3}D^{\circ} - 6p'' {}^{3}D$ $5d {}^{5}D^{\circ} - 6p {}^{5}P$ $6p {}^{5}P - 7s {}^{5}S^{\circ}$	1-2 2-2 2-2 0-1 2-2 3-3 3-2 2-2
2815,94 2814,47 2811,67 2810,52 2809,07	40 30 8 1 8	18,22 18,22 18,20 19,92 18,22	22,62 22,62 22,61 24,33 22,63	$6p\ ^5P-6d\ ^5D^{\circ} \ 6p\ ^5P-6d\ ^5D^{\circ} \ 6p\ ^5P-7s\ ^5S^{\circ} \ 6p'\ ^3F-33^{\circ} \ 6p\ ^5P-6d\ ^5D^{\circ}$	$ \begin{array}{c} 2-3 \\ 2-2 \\ 1-2 \\ 2-2, 3 \\ 2-1 \end{array} $
2807,25 2806,39 2805,08 2800,22 2794,86	10 3 2 20 20	20,39 16,91 18,39 18,20 18,20	24,80 21,32 22,81 22,62 22,63	$6p' {}^{1}F - 39^{\circ}$ $5d' 41^{\circ} - 6p' {}^{1}D$ $5d'' 15^{\circ} - 6p'' 32$ $6p {}^{5}P - 6d {}^{5}D^{\circ}$ $6p {}^{5}P - 6d {}^{5}D^{\circ}$	$ \begin{array}{r} 3-3 \\ 2-2 \\ 2-1 \\ 1-2 \\ 1-1 \end{array} $
2783 ,37 2779 ,64 2776 ,96 2772 ,41 2766 ,20	12 5 10 10 5	19,92 { 18,85 17,61 15,46 18,20 15,64	24,38 23,31 22,07 19,92 22,67 20,12	$6p'\ ^3F - 37^\circ \ 6p\ ^3P - 7s\ ^3S^\circ \ 5d'\ ^3D^\circ - 6p''\ 26 \ 5d\ ^3D^\circ - 6p'\ ^3F \ 6p\ ^5P - 6d\ ^5D^\circ \ 5d'\ ^3F^\circ - 6p'\ ^3D$	$ \begin{array}{c} 2-2, \ 3 \\ 2-1 \\ 2-1 \\ 2-2 \\ 1-0 \\ 3-2 \end{array} $
2763,00 2761,60 2760,76 2747,88 2740,80	1 12 6 8 12	16,14 { 18,39 16,14 18,32 16,14 15,64	20,62 22,88 20,63 22,81 20,63 20,16	$5d'$ ${}^{3}G^{\circ}$ — $4f'$ 6 $5d''$ 15° — $6p''$ 34 $5d'$ ${}^{3}G^{\circ}$ — $6p'$ ${}^{3}D$ $5d''$ 13° — $6p''$ 32 $5d'$ ${}^{3}G^{\circ}$ — $6p'$ ${}^{3}F$ $5d'$ ${}^{3}F^{\circ}$ — $6p'$ ${}^{3}F$	3-4 2-1 3-3 1-1 3-4 3-3
2728,22 2727,22 2696,50 2687,03 2685,58	4 4 8 5 2	15,57 15,84 15,12 13,87 17,45	20,12 20,39 19,71 18,46 22,06	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 3-3 \\ 1-1 \\ 2-3 \\ 1-2 \end{array} $
2678,54 2669,00 2661,00 2658,26 2650,20	1 10 1 3 1	16,70 13,84 15,46 13,97 18,63	21,32 18,48 20,12 18,63 23,31	$6s' ^{3}D^{\circ} - 6p' ^{1}D$ $5d ^{5}D^{\circ} - 6p ^{5}P$ $5d ^{3}D^{\circ} - 6p' ^{3}D$ $5d ^{5}D^{\circ} - 6p ^{3}P$ $6p ^{3}P - 7s ^{3}S^{\circ}$	2-2 3-3 2-2 0-1 1-1
2641,12 2637,54 2624,52 2608,90 2591,69	5 3 1 6 4	13,94 15,46 18,32 15,64 15,84	18,63 20,16 23,05 20,39 20,62	5d ⁵ D°—6p ³ P 5d ³ D°—6p' ³ F 5d" 13°—6p" 36 5d' ³ F°—6p' ¹ F 5d' ¹ F°—4f' 6	1-1 2-3 1-1, 2 3-3 3-4
2590,45 2578,62 2578,36 2572,30 2570,26	2 2 5 1 1	15,84 15,12 15,84 16,91 15,57	20,63 19,92 20,63 21,72 20,40	$\begin{array}{c} 5d' {}^{1}F^{\circ} - 6p' {}^{3}D \\ 5d {}^{3}D^{\circ} - 6p' {}^{3}F \\ 5d' {}^{1}F^{\circ} - 6p' {}^{3}F \\ 5d' {}^{4}1^{\circ} - 6p'' {}^{3}D \\ 6s {}^{3}S^{\circ} - 6p' {}^{4} \end{array}$	$ \begin{array}{r} 3-3 \\ 1-2 \\ 3-4 \\ 2-1 \\ 1-1 \end{array} $
2533,34 2524,09 2515,14 2510,52 2501,04	2 1 1 3 4	15,03 13,94 15,46 15,46 14,76	19,92 18,85 20,39 20,40 19,71	$5d ^3D^{\circ} - 6p' ^3F$ $5d ^5D^{\circ} - 6p ^3P$ $5d ^3D^{\circ} - 6p' ^1F$ $5d ^3D^{\circ} - 6p' ^4$ $5p^5 ^1P^{\circ} - 6p' ^3D$	$ \begin{array}{r} 3-2 \\ 1-2 \\ 2-3 \\ 2-1 \\ 1-1 \end{array} $
2486,69 2483,43 2472,34	3 1 1	13,87 15,64 15,64	18,85 20,63 20,65	5d ⁵ D°-6p ³ P 5d′ ³ F°-6p′ ³ D 5d′ ³ F°-6p′ ³ F	2—2 3—3 3—4

λ, Α	I	E _H , eV	E _B , eV	Transition	J
2471 ,28	3	13,84	18,85	5d ⁵ D°—6p ³ P	3-2
2463 ,02	1	18,01	23,05	5d′ ¹ D°—6p″ 36	2-1, 2
2452,62	3	15,64	20,69	$5d' ^3F^{\circ} - 6p' ^3P$	3-2
2447,64	1	13,57	18,63	$5p^5 ^3P^{\circ} - 6p ^3P$	0-1
2436,48	5	15,03	20,12	$5d ^3D^{\circ} - 6p' ^3D$	3-2
2416,73	4	15,03	20,16	$5d ^3D^{\circ} - 6p' ^3F$	3-3
2414,52	1	17,45	22,58	$5d' ^3S^{\circ} - 6p'' 28$	1-1
2403,76	1	16,91	20,06	$5d' 41^{\circ}-6p'' ^{3}D$	2-2
2312,29	1	14,76	20,12	$5p^{5} ^{1}P^{\circ}-6p' ^{3}D$	1-2
2303,73	1	15,46	20,84	$5d ^{3}D^{\circ}-6p' ^{3}P$	2-1
2235,35	1	16,52	22,06	$6s' ^{3}D^{\circ}-6p'' ^{3}D$	1-2
1978,702	3	15,46	21,72	$5d ^{3}D^{\circ}-6p'' ^{3}D$	2-1
1921,630	2	12,18	18,63	$5p^{5} {}^{3}P^{\circ} - 6p {}^{3}P$ $5d {}^{3}D^{\circ} - 6p'' {}^{3}D$ $5d {}^{3}D^{\circ} - 6p'' {}^{2}6$ $5d {}^{5}D^{\circ} - 6p' {}^{3}D$ $5d {}^{5}D^{\circ} - 6p' {}^{3}D$ $5d {}^{5}D^{\circ} - 4f' {}^{6}$ $5d {}^{5}D^{\circ} - 6p' {}^{3}D$ $5d {}^{5}D^{\circ} - 6p' {}^{3}F$ $5d {}^{5}D^{\circ} - 6p' {}^{3}F$ $5d {}^{5}D^{\circ} - 6p' {}^{3}P$ $5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}D$	2-1
1896,904	5	15,03	21,57		3-3
1874,907	5	15,46	22,07		2-1
1854,365	6	13,94	20,63		1-3
1834,254	4	13,87	20,63		2-3
1826,477	7	13,84	20,63		3-4
1825,858	3	13,84	20,63		3-3
1819,845	6	13,84	20,65		3-4
1817,381	2	13,87	20,69		2-2
1804,109	2	12,84	19,71		1-1
1750 ,749	2	12,84	19,92	$5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}F$	1-2
1579 ,498	5	12,84	20,69	$5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}P$	1-2
1562 ,563	4	12,18	20,12	$5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}D$	2-2
1554 ,438	1	12,18	20,16	$5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}F$	2-3
1549 ,975	2	12,84	20,84	$5p^{5} {}^{3}P^{\circ} - 6p' {}^{3}P$	1-1
1511,121 1509,454 1468,180 1457,356 1432,204 1393,496 1356,364 1253,645 1232,074 1225,089	3 2 4 3 4 1 3 2 25 3	12,18 12,18 12,18 12,18 12,18 12,18 12,84 12,18 12,18 2,12 4,64	20,39 20,40 20,63 20,69 20,84 21,72 21,32 22,07 12,18 14,76	$5p^{5} ^{3}P^{\circ} - 6p' ^{1}F$ $5p^{5} ^{3}P^{\circ} - 6p' ^{4}$ $5p^{5} ^{3}P^{\circ} - 6p' ^{3}D$ $5p^{5} ^{3}P^{\circ} - 6p' ^{3}P$ $5p^{5} ^{3}P^{\circ} - 6p ^{3}P$ $5p^{5} ^{3}P^{\circ} - 6p' ^{1}D$ $5p^{5} ^{3}P^{\circ} - 6p'' ^{2}D$ $5p^{5} ^{3}P^{\circ} - 6p'' ^{2}D$ $5p^{5} ^{3}P^{\circ} - 6p'' ^{2}D$ $5p^{4} ^{1}D - 5p^{5} ^{3}P^{\circ}$ $5p^{4} ^{1}S - 5p^{5} ^{1}P^{\circ}$	2-3 2-1 2-3 2-2 2-1 1-1 2-2 2-1 2-2 0-1
1183,053	8	4,64	15,12	$5p^{4} {}^{1}S - 5d {}^{3}D^{\circ}$	0-1 $2-1$ $1-2$ $1-1$ $2-3$
1156,480	9	2,12	12,84	$5p^{4} {}^{1}D - 5p^{5} {}^{3}P^{\circ}$	
1130,344	30	1,21	12,18	$5p^{4} {}^{3}P - 5p^{5} {}^{3}P^{\circ}$	
1066,391	12	1,21	12,84	$5p^{4} {}^{3}P - 5p^{5} {}^{3}P^{\circ}$	
1058,128	2	2,12	13,84	$5p^{4} {}^{1}D - 5d {}^{5}D^{\circ}$	
1055,328 1048,754 1047,801 1017,680 1010,376 1003,370 981,088 974,124 971,818 965,540	5 3 10 35 3 35 7 8 8	2,12 2,12 1,01 0,00 4,64 1,21 2,12 1,21 1,21 0,00	13,87 13,94 12,84 12,18 16,91 13,57 14,76 13,94 13,97 12,84	$5p^{4} ^{1}D - 5d ^{5}D^{\circ}$ $5p^{4} ^{1}D - 5d ^{5}D^{\circ}$ $5p^{4} ^{3}P - 5p^{5} ^{3}P^{\circ}$ $5p^{4} ^{3}P - 5d ^{5}D^{\circ}$ $5p^{4} ^{3}P - 5d ^{5}D^{\circ}$ $5p^{4} ^{3}P - 5d ^{5}D^{\circ}$ $5p^{4} ^{3}P - 5p^{5} ^{3}P^{\circ}$	2-2 2-1 0-1 2-2 0-2? 1-0 2-1 1-1 1-0 2-1
960,325	2	2,12	15,03	$5p^{4} ^{1}D - 5d ^{3}D^{\circ}$	2-3
958,585	4	1,01	13,94	$5p^{4} ^{3}P - 5d ^{5}D^{\circ}$	0-1
953,975	3	2,12	15,12	$5p^{4} ^{1}D - 5d ^{3}D^{\circ}$	2-1
917,257	4	2,12	15,64	$5p^{4} ^{1}D - 5d' ^{3}F^{\circ}$	2-3
915,488	3	1,21	14,76	$5p^{4} ^{3}P - 5p^{5} ^{1}P^{\circ}$	1-1
901,746	7	1,01	14,76	$5p^{4} ^{3}P - 5p' ^{5}P^{\circ}$	0-1
898,873	8	2,12	15,91	$5p^{4} ^{1}D - 5d' ^{3}F^{\circ}$	2-2

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λ, Λ	I	E _H , eV	E _B , eV	Transition	J
896,003 895,406 893,989	$\begin{array}{c} 20 \\ 4 \\ 20 \end{array}$	0,00 1,21 0,00	13,84 15,06 13,87	$5p^4 \ ^3P - 5d \ ^5D^{\circ} 5p^4 \ ^3P - 6s \ ^5S^{\circ} 5p^4 \ ^3P - 5d \ ^5D^{\circ}$	$ \begin{array}{c} 2 - 3 \\ 1 - 2 \\ 2 - 2 \end{array} $
891,833	9	1,21	15,12	$5p^{4} ^{3}P - 5d ^{3}D^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 0 - 1 \\ 1 - 2 \\ 1 - 1 \end{array} $
889,276	15	0,00	13,94	$5p^{4} ^{3}P - 5d ^{5}D^{\circ}$	
878,790	8	1,01	15,12	$5p^{4} ^{3}P - 5d ^{3}D^{\circ}$	
870,346	6	1,21	15,46	$5p^{4} ^{3}P - 5d ^{3}D^{\circ}$	
863,386	8	1,21	15,57	$5p^{4} ^{3}P - 6s ^{3}S^{\circ}$	
861,071	5	2,12	16,52	$5p^4 ^1D - 6s' ^3D^{\circ}$	2-1
852,950	25	4,64	19,17	$5p^4 ^1S - 6s'' ^1P^{\circ}$	0-1
851,147	8	1,01	15,57	$5p^4 ^3P - 6s' ^3S^{\circ}$	0-1
850,572	5	2,12	16,70	$5p^4 ^1D - 6s' ^3D^{\circ}$	2-2
840,162	7	0,00	14,76	$5p^4 ^3P - 5p^5 ^1P^{\circ}$	2-1
838,449	$\begin{array}{c} 3 \\ 4 \\ 30 \\ 25 \\ 4 \end{array}$	2,12	16,91	$5p^{4} ^{1}D - 5d' ^{4}1^{\circ}$	2-2
826,134		2,12	17,13	$5p^{4} ^{1}D - 5d' ^{3}D^{\circ}$	2-1
824,881		0,00	15,03	$5p^{4} ^{3}P - 5d ^{3}D^{\circ}$	2-3
823,210		0,00	15,06	$5p^{4} ^{3}P - 6s ^{5}S^{\circ}$	2-2
822,647		2,12	17,19	$5p^{4} ^{1}D - 6s' ^{3}D^{\circ}$	2-3
820,166	4	0,00	15,12	$5p^4 \ ^3P - 5d \ ^3D^{\circ}$	$ \begin{array}{c} 2-1 \\ 1-1 \\ 2-1 \\ 2-2 \\ 1-2 \end{array} $
810,119	7	1,21	16,52	$5p^4 \ ^3P - 6s' \ ^3D^{\circ}$	
808,860	3	2,12	17,45	$5p^4 \ ^3P - 5d' \ ^3S^{\circ}$	
801,980	15	0,00	15,46	$5p^4 \ ^3P - 5d \ ^3D^{\circ}$	
800,819	3	1,21	16,70	$5p^4 \ ^3P - 6s' \ ^3D^{\circ}$	
800,228	2	2,12	17,61	$5p^{4} ^{1}D - 5d' ^{3}D^{\circ}$	$ \begin{array}{c} 2-1 \\ 0-1 \\ 2-1 \\ 2-2 \\ 2-3 \end{array} $
799,338	8	1,01	16,52	$5p^{4} ^{3}P - 6s' ^{3}D^{\circ}$	
796,070	12	0,00	15,57	$5p^{4} ^{3}P - 6s ^{3}S^{\circ}$	
793,977	8	2,12	17,73	$5p^{4} ^{1}D - 6s' ^{1}D^{\circ}$	
793,292	8	2,12	17,75	$5p^{4} ^{1}D - 5d' ^{3}D^{\circ}$	
792,896 790,064 780,030 779,781 779,126	15 5 7 5 25	$0,00 \\ 1,21 \\ 2,12 \\ 1,01 \\ 1,21 \\ 0,00$	15,64 16,91 18,01 16,91 17,13 15,91	$5p^{4} ^{3}P - 5d' ^{3}F^{\circ}$ $5p^{4} ^{3}P - 5d' ^{4}1^{\circ}$ $5p^{4} ^{1}D - 5d' ^{1}D^{\circ}$ $5p^{4} ^{3}P - 5d' ^{4}1^{\circ}$ $5p^{4} ^{3}P - 5d' ^{3}F^{\circ}$	$ \begin{array}{r} 2-3 \\ 4-2 \\ 2-2 \\ 0-2? \\ 4-4 \\ 2-2 \end{array} $
769,143	10	1,01	17,13	$5p^4 \ ^3P - 5d' \ ^3D^{\circ}$	$ \begin{array}{c} 0-1 \\ 2-1 \\ 1-1 \\ 2-2 \\ 1-2 \end{array} $
765,120	7	2,12	18,32	$5p^4 \ ^1D - 5d'' \ 13^{\circ}$	
763,736	7	1,21	17,45	$5p^4 \ ^3P - 5d' \ ^3S^{\circ}$	
761,790	5	2,12	18,39	$5p^4 \ ^1D - 5d'' \ 15^{\circ}$	
756,031	10	1,21	17,61	$5p^4 \ ^3P - 5d' \ ^3D^{\circ}$	
754,144 750,447 750,155 744,141 742,566	5 8 8 6 15	1,01 1,21 2,12 2,12 2,12 0,00	17,45 17,73 18,65 18,78 16,70	$5p^4 \ ^3P - 5d' \ ^3S^{\circ}$ $5p^4 \ ^3P - 6s' \ ^1D^{\circ}$ $5p^4 \ ^1D - 5d'' \ 19^{\circ}$ $5p^4 \ ^1D - 6s'' \ ^3P^{\circ}$ $5p^4 \ ^3P - 6s' \ ^3D^{\circ}$	0-1 $1-2$ $2-2$ $2-1$ $2-2$
737,979	7	1,21	18,01	$5p^{4} ^{3}P - 5d' ^{1}D^{\circ}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-2 \\ 2-1 \\ 1-1 \end{array} $
733,314	10	0,00	16,91	$5p^{4} ^{3}P - 5d' ^{4}1^{\circ}$	
731,030	15	2,12	19,08	$5p^{4} ^{1}D - 6s'' ^{3}P^{\circ}$	
727,058	9	2,12	19,17	$5p^{4} ^{1}D - 6s'' ^{1}P^{\circ}$	
724,623	3	1,21	18,32	$5p^{4} ^{3}P - 5d'' ^{1}3^{\circ}$	
723,873 721,630 721,199 715,986 711,190	5 4 10 4 4 5	0,00 1,21 0,00 1,01 1,21	17,13 18,39 17,19 18,32 18,65	$5p^{4} ^{3}P - 5d' ^{3}D$ $5p^{4} ^{3}P - 5d'' 15^{\circ}$ $5p^{4} ^{3}P - 6s' ^{3}D^{\circ}$ $5p^{4} ^{3}P - 5d'' 13^{\circ}$ $5p^{4} ^{3}P - 5d'' 19^{\circ}$	2-1 1-2 2-3 0-1 1-2
710,677 710,576 705,783 705,096 703,906	5 5 12 9	1,21 0,00 1,21 2,12 0,00	18,66 17,45 18,78 19,70 17,61	$5p^{4} ^{3}P - 6s'' ^{3}P^{\circ}$ $5p^{4} ^{3}P - 5d' ^{3}S^{\circ}$ $5p^{4} ^{3}P - 6s'' ^{3}P^{\circ}$ $5p^{4} ^{1}D - 5d'' ^{2}3^{\circ}$ $5p^{4} ^{2}P - 5d' ^{3}D^{\circ}$	$ \begin{array}{r} 1 - 0 \\ 2 - 1 \\ 1 - 1 \\ 2 - 2 \\ 2 - 2 \end{array} $

λ, Α	I	E _H , eV	E _B , eV	Transition	J
702,799 699,070 698,541 697,526 693,972	8 5 20 8 10	2,12 0,00 0,00 1,01 1,21	19,76 17,73 17,75 18,78 19,08	$5p^{4} ^{1}D - 5d'' ^{25}\circ 5p^{4} ^{3}P - 6s' ^{1}D\circ 5p^{4} ^{3}P - 5d' ^{3}D\circ 5p^{4} ^{3}P - 6s'' ^{3}P\circ 5p^{4} ^{3}P - 6s'' ^{3}P\circ$	$ \begin{array}{c} 2-1 \\ 2-2 \\ 2-3 \\ 0-1 \\ 1-2 \end{array} $
691,036 690,397 688,231 682,564 676,606	7 7 4 7 9	2,12 1,21 0,00 1,01 0,00	20,06 19,17 18,01 19,17 18,32	$5p^{4} ^{1}D - 5d'' ^{2}7^{\circ}$ $5p^{4} ^{3}P - 6s'' ^{1}P^{\circ}$ $5p^{4} ^{3}P - 5d' ^{1}D^{\circ}$ $5p^{4} ^{3}P - 6s'' ^{1}P^{\circ}$ $5p^{4} ^{3}P - 5d'' ^{1}3^{\circ}$	$ \begin{array}{r} 2-2 \\ 1-1 \\ 2-2 \\ 0-1 \\ 2-1 \end{array} $
673,996 673,813 670,55 668,473 664,877	9 9 2 4 6	0,00 0,00 1,21 1,21 0,00	18,39 18,40 19,70 19,76 18,65	$5p^4$ 3P — $5d''$ 15° $5p^4$ 3P — $5d''$ 17° $5p^4$ 3P — $5d''$ 23° $5p^4$ 3P — $5d''$ 25° $5p^4$ 3P — $5d''$ 19°	$ \begin{array}{c} 2-2 \\ 2-3 \\ 1-2 \\ 1-1 \\ 2-2 \end{array} $
661,124 660,124 657,828 646,667 629,217 627,393	4 8 8 5 7 4	1,01 0,00 1,21 0,00 0,00 0,00	19,76 18,78 20,06 19,17 19,70	$5p^4$ 3P — $5d''$ 25° $5p^4$ 3P — $6s''$ $^3P^\circ$ $5p^4$ 3P — $5d''$ 27° $5p^4$ 3P — $6s''$ $^1P^\circ$ $5p^4$ 3P — $5d''$ 23° $5p^4$ 3P — $5d''$ 25°	0-1 $2-1$ $1-2$ $2-1$ $2-2$ $2-1$

Xe IV, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^{3 4}S_{3/2}^0$

λ, Å	I	E _H , eV	$E_{ m B}$, eV	Transition	J
1249,28 1217,26 1196,29 1157,46 1118,42	_ _ _ _	5,19 2,17 5,19 1,64 2,17	15,12 12,36 15,56 12,36 13,26	$5p^3 {}^2P^{\circ}$ —121929 $5p^3 {}^2D^{\circ}$ —99644 $5p^3 {}^2P^{\circ}$ —125475 $5p^3 {}^2D^{\circ}$ —99664 $5p^3 {}^2D^{\circ}$ —106924	$\begin{array}{c} 3/2 - 3/2 \\ 5/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 5/2 - 3/2, & 5/2 \end{array}$
1097,16 1067,74 1065,04 1041,81 1026,28	- - - -	5,19 1,64 3,48 1,64 3,48	16,49 13,26 15,12 13,55 15,56	$5p^3 ^2P^{\circ}$ —133027 $5p^3 ^2D^{\circ}$ —106924 $5p^3 ^2P^{\circ}$ —121929 $5p^3 ^2D^{\circ}$ —109255 $5p^3 ^2P^{\circ}$ —125475	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2, & 5/2 \\ 1/2 - 3/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
1003,37 957,70 952,46 935,24 926,24	_ _ _ _	0,00 2,17 3,48 0,00 2,17	12,36 15,12 16,49 13,26 15,56	$5p^3 ^4S^{\circ} - 99664$ $5p^3 ^2D^{\circ} - 121929$ $5p^3 ^2P^{\circ} - 133027$ $5p^3 ^4S^{\circ} - 106924$ $5p^3 ^2D^{\circ} - 125475$	$\begin{array}{c} 3/2 - 3/2, & 5/2 \\ 5/2 - 3/2, & \\ 1/2 - 3/2, & \\ 3/2 - 3/2, & 5/2 \\ 5/2 - 3/2, & 5/2 \end{array}$
920,29 915,29 891,21 865,69 851,29	_ _ _ _	1,64 0,00 1,64 2,17 2,17	15,12 13,55 15,56 16,49 16,73	$5p^3 ^2D^{\circ}$ —121929 $5p^3 ^4S^{\circ}$ —109255 $5p^3 ^2D^{\circ}$ —125475 $5p^3 ^2D^{\circ}$ —133027 $5p^3 ^2D^{\circ}$ —134981	$\begin{array}{c} 3/2 - 3/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2, & 5/2 \\ 5/2 - 3/2 \\ 5/2 - 3/2, & 5/2 \end{array}$
840,46 835,01 821,60 820,15 811,51	_ _ _ _	2,17 1,64 1,64 0,00 1,64	16,92 16,49 16,73 15,12 16,92	$5p^3 ^2D^{\circ}$ —136495 $5p^3 ^2D^{\circ}$ —133027 $5p^3 ^2D^{\circ}$ —134981 $5p^3 ^4S^{\circ}$ —121929 $5p^3 ^2D^{\circ}$ —136495	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
796,97 783,73	-	$^{0,00}_{2,17}$	15,56 17,99	$5p^3 {}^4S^{\circ} - 125475 5p^3 {}^2D^{\circ} - 145107$	$\frac{3}{2}$ $\frac{3}{2}$, $\frac{5}{2}$ $\frac{5}{2}$

			` _		
λ, Å	I	E _H , eV	EB, eV	Transition	J
758,50 751,73 740,85 732,63 689,15 683,97 672,57 647,12		1,64 0,00 0,00 0,00 0,00 0,00 0,00 0,00	17,99 16,49 16,73 16,92 17,99 18,13 18,43 19,16	$5p^3 ^2D^\circ - 145107$ $5p^3 ^4S^\circ - 133027$ $5p^3 ^4S^\circ - 134981$ $5p^3 ^4S^\circ - 136495$ $5p^3 ^4S^\circ - 145107$ $5p^3 ^4S^\circ - 146205$ $5p^3 ^4S^\circ - 148684$ $5p^3 ^4S^\circ - 154532$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 1/2 \end{array} $
630,48 626,40 619,44 611,26 602,43	_ _ _ _	0,00 0,00 0,00 0,00 0,00	19,66 19,79 20,01 20,28 20,58	$5p^3 {}^4S^\circ - 158610$ $5p^3 {}^4S^\circ - 159643$ $5p^3 {}^4S^\circ - 161435$ $5p^3 {}^4S^\circ - 163596$ $5p^3 {}^4S^\circ - 165995$	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \end{array}$
598,06 587,78 586,54 577,30 568,04 558,66	_ _ _ _ _	0,00 0,00 0,00 0,00 0,00 0,00	20,73 21,09 21,14 21,48 21,83 22,19	$5p^3 ^4S^\circ - 167208$ $5p^3 ^4S^\circ - 170132$ $5p^3 ^4S^\circ - 170491$ $5p^3 ^4S^\circ - 173221$ $5p^3 ^4S^\circ - 176043$ $5p^3 ^4S^\circ - 179001$	$\begin{array}{c} 3/2 - 1/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \\ 3/2 - 3/2, & 5/2 \end{array}$

Note. No experimental data on the spectrum of Xe IV have yet been published. In the table we therefor give wavelengths calculated from energy levels [10].

Xe V, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^{2} ^3P$

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
682,56	3	_	_	_	_

Xe VI, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^2 P_{1/2}^0$

λ, Å	I	E _H , eV	$E_{\mathrm{B}}, \ \mathrm{eV}$	Transition	J
880,04 800,84 599,84	$\begin{array}{c}2\\2\\3\end{array}$	 	_ _ _	=	Ξ

XeVII, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 {}^1S_0$

λ, Å	I	E _H , eV	E _B , eV	Transition	J
995,50	3	_	_	$5s^2 {}^1S - 5p {}^3P^{\circ}$	0—1
723,71	3	_	_	$5p\ ^3P^{\circ}-5p^{2}\ ^3P$	2-2
698,02	10			$5s^2 {}^1S - 5p {}^1P^{\circ}$	0—1
566,04	2	_		$5p\ ^{3}P^{\circ}-5d\ ^{3}D$	2—3
531,18	1	_	_	$5p ^{3}P^{\circ} - 5d ^{3}D$	1 -2
06				•	

Xe VIII, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 S_{1/2}$

λ, Å	I	E _H , eV	EB, eV	Transition	J
858,59	3	_	_	5s ² S5p ² P°	1/2-1/2
740,44	7		_	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\frac{1}{2}$ $\frac{3}{2}$
562,55	2	_		$5p {}^{2}P^{\circ} - 5d {}^{2}D$	$\frac{3}{2}$ $\frac{5}{2}$
517,00	2	_		$5p^{-2}P^{\circ}$ — $5d^{-2}D$	$^{1}/_{2}$ — $^{3}/_{2}$

Unclassified Lines of Xenon Belonging to Xe I or Xe II [11]

λ, Å	I	λ, Å	I	λ, Å	1
1170,43	3	784,09	2	682,82	7
1152,19	7	774,53	4	680,58	2
1110,62	3	750,76	3	673,87	3
1085,47	2	726,99	2	665,09	4
959,22	2	718,89	3	643,19	2
842,35	5	716,09	2	640,36	2
839,73	2	690,40	1	639,99	2
793,53	4	686,73	1	,	

CESIUM, Z = 55

Cs I, ground state: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^6 6s^2 S_{1/2}$ Ionization potential $31\,406,45$ cm⁻¹; 3,894 eV

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
74250 71930 68070 42202,3 39398,5	10 13 15 4 30	3,35 3,01 3,01 2,72 3,03	3,52 3,19 3,20 3,01 3,35	$5g^{2}G - 6h^{2}H^{\circ}$ $8s^{2}S - 8p^{2}P^{\circ}$ $8s^{2}S - 8p^{2}P^{\circ}$ $7p^{2}P^{\circ} - 8s^{2}S$ $4f^{2}F^{\circ} - 5g^{2}G$	7/2, $9/2 - 9/2$, $11/21/2 - 1/21/2 - 3/23/2 - 1/25/2$, $7/2 - 7/2$, $9/2$
39180,1 36127,7 34900 30952 30102	10 20 25 22 30	2,70 1,45 1,45 2,30 1,38	3,01 1,80 1,81 2,70 1,80	$7p ^{2}P^{\circ} - 8s ^{2}S$ $6p ^{2}P^{\circ} - 5d ^{2}D$ $6p ^{2}P^{\circ} - 5d ^{2}D$ $7s ^{2}S - 7p ^{2}P^{\circ}$ $6p ^{2}P^{\circ} - 5d ^{2}D$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \end{array}$
29308 24373 24248 23340 23032	3 9,5 80 50 15	2,30 2,72 2,72 2,70 2,80	2,72 3,23 3,23 3,23 3,34	$7s {}^{2}S - 7p {}^{2}P^{\circ}$ $7p {}^{2}P^{\circ} - 7d {}^{2}D$ $7p {}^{2}P^{\circ} - 7d {}^{2}D$ $7p {}^{2}P^{\circ} - 7d {}^{2}D$ $6d {}^{2}D - 5f {}^{2}F^{\circ}$	$ \begin{array}{c} 1/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 5/2 - 5/2, & 7/2 \end{array} $
22949 22909 22810 20140 19809	0,2 0,6 10 6 1,3	3,03 3,03 2,80 2,72 2,80	3,57 3,57 3,34 3,34 3,43	$4f {}^{2}F^{\circ} - 9d {}^{2}D$ $4f {}^{2}F^{\circ} - 9d {}^{2}D$ $6d {}^{2}D - 5f {}^{2}F^{\circ}$ $7p {}^{2}P^{\circ} - 9s {}^{2}S$ $6d {}^{2}D - 9p {}^{2}P^{\circ}$	$\begin{array}{c} 5/2 - \frac{3}{2} \\ 7/2 - \frac{5}{2} \\ 3/2 - \frac{5}{2} \\ 3/2 - \frac{1}{2} \\ 3/2 - \frac{1}{2} \end{array}$
19800 19624 19430 17549 17417	1,7 0,2 3 4 4	2,80 2,80 2,70 2,80 2,80	3,43 3,43 3,34 3,51 3,51	$6d \ ^{2}D - 9p \ ^{2}P^{\circ} \ 6d \ ^{2}D - 9p \ ^{2}P^{\circ} \ 7p \ ^{2}P^{\circ} - 9s \ ^{2}S \ 6d \ ^{2}D - 6f \ ^{2}F^{\circ} \ 6d \ ^{2}D - 6f \ ^{2}F^{\circ}$	$\begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 1/2 - 1/2 \\ 5/2 - 5/2, & 7/2 \\ 3/2 - 5/2 \end{array}$
17046,8 17015 16540 14694,93 13939	9 4 1000 5	2,72 2,72 2,70 1,45 2,30	3,45 3,45 3,45 2,30 3,19	$7p \ ^{2}P^{\circ}$ —8 $d \ ^{2}D$ $7p \ ^{2}P^{\circ}$ —8 $d \ ^{2}D$ $7p \ ^{2}P^{\circ}$ —8 $d \ ^{2}D$ 6 $p \ ^{2}P^{\circ}$ —7 $s \ ^{2}S$ 7 $s \ ^{2}S$ —8 $p \ ^{2}P^{\circ}$	$\begin{array}{c} 3/_{2} - 3/_{2} \\ 3/_{2} - 5/_{2} \\ 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
13779 13758,83 13602,57 13588,31 13424,32	12 36 36 290 30	2,30 1,80 1,81 1,38 1,80	3,20 2,70 2,72 2,30 2,72	$7s^{2}S - 8p^{2}P^{\circ}$ $5d^{2}D - 7p^{2}P^{\circ}$ $5d^{2}D - 7p^{2}P^{\circ}$ $6p^{2}P^{\circ} - 7s^{2}S$ $5d^{2}D - 7p^{2}P^{\circ}$	$\begin{array}{c} 1/_{2} - 3/_{2} \\ 3/_{2} - 1/_{2} \\ 5/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 3/_{2} - 3/_{2} \end{array}$
10985 10930 10123,6025 10123,415 10024,3595	1,5 7 1200 200 1000	2,30 2,30 1,81 1,81 1,81	3,43 3,43 3,03 3,03 3,03	7s ² S—9p ² P° 7s ² S—9p ² P° 5d ² D—4f ² F° 5d ² D—4f ² F° 5d ² D—4f ² F°	$ \begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 5/_{2} - 7/_{2} \\ 5/_{2} - 5/_{2} \\ 5/_{2} - 3/_{2} \end{array} $
9208,5382 9172,3217 8943,483 8761,415 8521,149	200 1000 2000 500 4000	1,45 1,45 0,00 1,38 0,00	2,80 2,80 1,38 2,80 1,45	$6p \ ^{2}P^{\circ}$ — $6d \ ^{2}D$ $6p \ ^{2}P^{\circ}$ — $6d \ ^{2}D$ $6s \ ^{2}S$ — $6p \ ^{2}P^{\circ}$ $6p \ ^{2}P^{\circ}$ — $6d \ ^{2}D$ $6s \ ^{2}S$ — $6p \ ^{2}P^{\circ}$ $6s \ ^{2}S$ — $6p \ ^{2}P^{\circ}$	3/2 - 3/2 $3/2 - 5/2$ $1/2 - 1/2$ $1/2 - 3/2$ $1/2 - 3/2$
8079,0332 8078,923 8053,35 8015,7235 7990,68	1000 100 100 200 100	1 ,81 1 ,81 1 ,81 1 ,80 1 ,80	3,34 3,34 3,35 3,34 3,35	$5d\ ^{2}D$ — $5f\ ^{2}F^{\circ}$ $5d\ ^{2}D$ — $5f\ ^{2}F^{\circ}$ $5d\ ^{2}D$ — $5g\ ^{2}G$ $5d\ ^{2}D$ — $5f\ ^{2}F^{\circ}$ $5d\ ^{2}D$ — $5f\ ^{2}F^{\circ}$ $5d\ ^{2}D$ — $5g\ ^{2}G$	$\begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 5/2 - 7/2, & 9/2 \\ 3/2 - 5/2 \\ 3/2 - 7/2, & 9/2 \end{array}$
7943,8820 7608,9032 608	800 500	1,45 1,38	3,01 3,01	6p ² P°—8s ² S 6p ² P°—8s ² S	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

λ, Ä	1	E _H , eV	E _B , eV	Transition	J
7279,9570 7279,895 7270,70	500 100 15	1 ,81 1 ,81 1 ,81	3,51 3,51 3,51	5d ² D-6f ² F° 5d ² D-6f ² F° 5d ² D-6g ² G	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
7228,5356 7219,70 6983,4912 6973,2966 6895,005	500 15 25 500	1,80 1,80 1,45 1,45 0,00	3,51 3,51 3,23 3,23 1,80	$5d^{2}D-6f^{2}F^{\circ} \ 5d^{2}D-6g^{2}G \ 6p^{2}P^{\circ}-7d^{2}D \ 6p^{2}P^{\circ}-7d^{2}D \ 6s^{2}S-5d^{2}D$	$ \frac{3}{2} - \frac{5}{2} $ $ \frac{3}{2} - \frac{7}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{3}{2} - \frac{5}{2} $ $ \frac{1}{2} - \frac{3}{2} $
6870,4552 6870,419 6848,906 6824,6520 6723,2943	200 2 200 500	1,81 1,81 0,00 1,80 1,38	3,61 3,61 1,81 3,61 3,23	$5d^{2}D - 7f^{2}F^{\circ}$ $5d^{2}D - 7f^{2}F^{\circ}$ $6s^{2}S - 5d^{2}D$ $5d^{2}D - 7f^{2}F^{\circ}$ $6p^{2}P^{\circ} - 7d^{2}D$	$ \begin{array}{c} 5/2 - 7/2 \\ 5/2 - 5/2 \\ 1/2 - 5/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \end{array} $
6628,6605 6586,5096 6586,022 6472,6226 6431,9693	35 500 35 45 15	1,81 1,45 1,80 1,81 1,80	3,68 3,34 3,68 3,72 3,72	$5d\ ^{2}D-8f\ ^{2}F^{\circ}\ 6p\ ^{2}P^{\circ}-9s\ ^{2}S\ 5d\ ^{2}D-8f\ ^{2}F^{\circ}\ 5d\ ^{2}D-9f\ ^{2}F^{\circ}\ 5d\ ^{2}D-9f\ ^{2}F^{\circ}$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
6365,5235 6354,5548 6326,2055 6288,5975 6250,2206	$\frac{2}{2}$	1,81 1,38 1,80 1,81 1,80	3,76 3,34 3,76 3,78 3,78	5d ² D-10f ² F° 6p ² P°-9s ² S 5d ² D-10f ² F° 5d ² D-11f ² F° 5d ² D-11f ² F°	$ \begin{array}{c} 5/2 - 7/2 \\ 1/2 - 1/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \\ 3/2 - 5/2 \end{array} $
6231,31 6217,5986 6213,0998 6193,66 6187,54		1,81 1,45 1,45 1,80 1,81	3,80 3,45 3,45 3,80 3,81	$5d^{2}D$ — $12f^{2}F^{\circ}$ $6p^{2}P^{\circ}$ — $8d^{2}D$ $6p^{2}P^{\circ}$ — $8d^{2}D$ $5d^{2}D$ — $12f^{2}F^{\circ}$ $5d^{2}D$ — $13f^{2}F^{\circ}$	$\begin{array}{c} 5/2 - 7/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 5/2 - 7/2 \end{array}$
6153,24 6150,38 6116,52 6034,0895 6010,4905		1,81 1,80 1,80 1,45 1,38	3,82 3,81 3,82 3,51 3,45	$5d\ ^{2}D-14f\ ^{2}F^{\circ}\ 5d\ ^{2}D-13f\ ^{2}F^{\circ}\ 5d\ ^{2}D-14f\ ^{2}F^{\circ}\ 6p\ ^{2}P^{\circ}-10s\ ^{2}S\ 6p\ ^{2}P^{\circ}-8d\ ^{2}D$	$ \begin{array}{c} 5/2 - 7/2 \\ 3/2 - 5/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
5847,64 5845,1410 5838,8347 5745,7244 5664,0183	- -	1,45 1,45 1,38 1,45 1,38	3,57 3,57 3,51 3,61 3,57	$6p ^{2}P^{\circ} - 9d ^{2}D$ $6p ^{2}P^{\circ} - 9d ^{2}D$ $6p ^{2}P^{\circ} - 10s ^{2}S$ $6p ^{2}P^{\circ} - 14s ^{2}S$ $6p ^{2}P^{\circ} - 9d ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 1/2 \\ 3/2 - 1/2 \\ 1/2 - 3/2 \end{array} $
5636,67 5635,2123 5573,6740 5568,4078 5503,8524) — 3 —	1,45 1,45 1,45 1,38 1,45	3,65 3,65 3,68 3,61 3,71	$6p \ ^{2}P^{\circ}-10d \ ^{2}D$ $6p \ ^{2}P^{\circ}-10d \ ^{2}D$ $6p \ ^{2}P^{\circ}-12s \ ^{2}S$ $6p \ ^{2}P^{\circ}-11s \ ^{2}S$ $6p \ ^{2}P^{\circ}-11d \ ^{2}D$	$ \begin{array}{c} 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 1/2 - 1/2 \\ 3/2 - 3/2 \end{array} $
5502,8843 5465,9443 5461,9231 5414,28 5413,6145	5 1 — —	1,45 1,38 1,45 1,45 1,45	3,71 3,65 3,72 3,74 3,74	$6p \ ^{2}P^{\circ}-11d \ ^{2}D$ $6p \ ^{2}P^{\circ}-10d \ ^{2}D$ $6p \ ^{2}P^{\circ}-13s \ ^{2}S$ $6p \ ^{2}P^{\circ}-12d \ ^{2}D$ $6p \ ^{2}P^{\circ}-12d \ ^{2}D$	$\begin{array}{c} 3/_2 - 5/_2 \\ 1/_2 - 3/_2 \\ 3/_2 - 1/_2 \\ 3/_2 - 3/_2 \\ 3/_2 - 5/_2 \end{array}$
5406,6672 5350,8 5350,3542 5340,9448 5303,7766	2 — 8 —	1,38 1,45 1,45 1,38 1,45	3,68 3,77 3,77 3,71 3,79	$\begin{array}{c} 6p \ ^{2}P^{\circ}-12s \ ^{2}S \\ 6p \ ^{2}P^{\circ}-13d \ ^{2}D \\ 6p \ ^{2}P^{\circ}-13d \ ^{2}D \\ 6p \ ^{2}P^{\circ}-14d \ ^{2}D \\ 6p \ ^{2}P^{\circ}-14d \ ^{2}D \end{array}$	$\begin{array}{c} 1/2 - 1/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 1/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
5301,40 5256,563: 5196,734: 5152,684: 4593,172	3 —	1,38 1,38 1,38 1,38 0,00	3,72 3,74 3,77 3,79 2,70	$\begin{array}{c} 6p\ ^2P^\circ - 13s\ ^2S \\ 6p\ ^2P^\circ - 12d\ ^2D \\ 6p\ ^2P^\circ - 13d\ ^2D \\ 6p\ ^2P^\circ - 14d\ ^2D \\ 6s\ ^2S - 7p\ ^2P^\circ \end{array}$	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \end{array} $

λ, Å	I	$E_{ m H}^{},~{ m eV}$	E _B , eV	Transition	J
4555,280 4425,726 4417,344 3888,610 3876,146	2000 — 150 300	0,00 0,00 0,00 0,00 0,00	2,72 2,80 2,80 3,19 3,20	$6s ^2S - 7p ^2P^{\circ}$ $6s ^2S - 6d ^2D$ $6s ^2S - 6d ^2D$ $6s ^2S - 8p ^2P^{\circ}$ $6s ^2S - 8p ^2P^{\circ}$	$^{1/2}$ _{2}_{1/2}_{3/2}_{3/2}_{1/2}_{1/2}_{1/2}_{1/2}_{1/2}_{1/2}_{1/2}_{1/2}_{3/2}
3617,295 3611,459 3480,063 3476,814 3399,983	60 200 50 100 30	0,00 0,00 0,00 0,00 0,00	3,43 3,43 3,56 3,56 3,64	$6s^{2}S - 9p^{2}P^{\circ}$ $6s^{2}S - 9p^{2}P^{\circ}$ $6s^{2}S - 10p^{2}P^{\circ}$ $6s^{2}S - 10p^{2}P^{\circ}$ $6s^{2}S - 11p^{2}P^{\circ}$	$\begin{array}{c} 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \\ 1/_{2} - 3/_{2} \\ 1/_{2} - 1/_{2} \end{array}$
3397,969 3348,825 3347,494 3314,059 3313,124	60 15 30 5 10	00, 0 00, 0 00, 0 00, 0 00, 0	3,65 3,70 3,70 3,74 3,74	$6s^{2}S-11p^{2}P^{\circ} \ 6s^{2}S-12p^{2}P^{\circ} \ 6s^{2}S-12p^{2}P^{\circ} \ 6s^{2}S-13p^{2}P^{\circ} \ 6s^{2}S-13p^{2}P^{\circ} \ 6s^{2}S-13p^{2}P^{\circ}$	$\begin{array}{c} 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array}$
3289,290 3288,605 3270,980 3270,477 3183,132	2 4 1 2	00,00 0,00 0,00 0,00 0,00	3,77 3,77 3,79 3,79 3,89	$6s ^2S - 14p ^2P^{\circ}$ $6s ^2S - 14p ^2P^{\circ}$ $6s ^2S - 15p ^2P^{\circ}$ $6s ^2S - 15p ^2P^{\circ}$ Limit of series	$ \begin{array}{c} 1/2 - 1/2 \\ 1/2 - 3/2 \\ 1/2 - 1/2 \\ 1/2 - 3/2 \end{array} $

Cs II, ground state: $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p^{6} 1S_0$ Ionization potential 202 263 cm⁻¹; 25,076 eV

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λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
6955,519 6536,440 6506,254 6495,528 6419,541	20 15 5 15 10	14,10 13,98 17,77 14,10 13,75	15,88 15,88 19,68 16,01 15,68	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3-2 2-2 1-2 3-3 1-1
6128,619 6076,738 5925,651 5863,701 5831,159	20 2 60 5 60	13,98 16,51 13,91 14,10 13,75	16,01 18,55 16,01 16,21 15,88	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 2 - 3 \\ 0 - 1 \\ 4 - 3 \\ 3 - 2 \\ 1 - 2 \end{array} $
5814,181 5579,033 5563,019 5419.,687 5407,35	$25 \\ 2 \\ 125 \\ 60 \\ 2$	13,98 15,33 13,98 16,21	16,12 17,55 16,21 18,50	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-1 1-1 2-2 2-2 -
5370,979 5358,53 5349,16 5306,609 5274,044	80 500 25 25 40	13,38 17,92 15,23 16,21 13,34	15,68 20,23 17,55 18,55 15,68	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ 6p' \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \end{array}$	1-1 0-1 1-1 2-1 0-1
5263 ,21 5249 ,373 5227 ,002 5209 ,62 5096 ,604	2 80 200 15 40	17,78 13,75 13,31 — 16,12	20,13 16,12 15,68 — 18,55	$\begin{array}{c} 6p' \ [1^{1}/_{2}] - 162388^{\circ} \\ 5d \ [1^{1}/_{2}]^{\circ} - 6p \ [1^{1}/_{2}] \\ 6s \ [1^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ - \\ 6p \ [1^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	2-3 1-1 2-1 1-1
5081,77 5080,10 5070,684 5059,866	10 5 2 25	17,77 15,33 15,33	20 ,21 17 ,77 17 ,78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-0 - 1-1 1-2

λ, Å	I	E _H , eV	EB; eV	Transition	J
5052,696 5043,800 5041,828 5012,979 4972,593	25 80 5 5 25	13,43 13,75 17,77 17,92 16,01	15,88 16,21 20,23 20,39 18,50	$5d [1^{1}/_{2}]^{\circ}-6p [2^{1}/_{2}]$ $5d [1^{1}/_{2}]^{\circ}-6p [1^{1}/_{2}]$ $6p' [1^{1}/_{2}]-7s' [1^{1}/_{2}]^{\circ}$ $6p' [1^{1}/_{2}]-164465^{\circ}$ $6p [2^{1}/_{2}]-7s [1^{1}/_{2}]^{\circ}$	2-2 1-2 1-1 0-1 3-2
4952,835 4943,01 4925,744 4879,95 4870,024	30 10 5 2 30	13,38 13,17 15,23 15,23	15,88 	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c} 1-2 \\ -1 \\ 1-1 \\ 1-1 \\ 1-2 \end{array} $
4830,161 4806,924 4786,363 4763,616 4749,132	30 5 15 25 10	13,31 17,55 15,33 — 17,78	15,88 20,13 17,92 — 20,39	$\begin{array}{c} 6s \left[\frac{1}{2}\right]^{\circ} - 6p \left[\frac{2}{2}\right] \\ 6p' \left[\frac{1}{2}\right] - 162352^{\circ} \\ 5d' \left[\frac{1}{2}\right]^{\circ} - 6p' \left[\frac{1}{2}\right] \\ - \\ 6p' \left[\frac{1}{2}\right] - 1644444^{\circ} \end{array}$	$ \begin{array}{c} 2-2 \\ 1-0 \\ 1-0 \\ - \\ 2-2 \end{array} $
4744,60 4739,665 4732,975 4726,684 4701,793	5 20 20 5 25	17,78 17,77 15,88 14,93 17,78	20,39 20,39 18,50 17,55 20,41	$\begin{array}{c} 6p' \ [1^{1}/_{2}] - 164465^{\circ} \\ 6p' \ [^{1}/_{2}] - 164444^{\circ} \\ 6p \ [2^{1}/_{2}] - 7s \ [1^{1}/_{2}]^{\circ} \\ 5d' \ [2^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p' \ [1^{1}/_{2}] - 164656^{\circ} \end{array}$	$ \begin{array}{r} 2-1 \\ 1-2 \\ 2-2 \\ 2-1 \\ 2-1 \end{array} $
4695,610 4692,482 4670,280 4656,538 4646,508	10 5 20 12 25	17,92 17,77 16,21 17,55 15,88	20,56 20,41 18,86 20,21 18,55	$\begin{array}{c} 6p' \ [^{1}/_{2}] - 165813^{\circ} \\ 6p' \ [^{1}/_{2}] - 164656^{\circ} \\ 6p \ [^{1}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \\ 6p' \ [^{1}/_{2}] - 7s' \ [^{1}/_{2}]^{\circ} \\ 6p \ [^{2}/_{2}] - 6d \ [^{1}/_{2}]^{\circ} \end{array}$	0-1 1-1 2-1 1-0 2-1
4640,333 4623,091 4620,59 4616,13 4609,99	5 20 10 15 10		20,23 17,92 16,12	$\begin{array}{c} - \\ 6p' \left[1^{1}/_{2}\right] - 7s' \left[1/_{2}\right]^{\circ} \\ - \\ 6s' \left[1/_{2}\right]^{\circ} - 6p' \left[1/_{2}\right] \\ 5d \left[1^{1}/_{2}\right]^{\circ} - 6p \left[1^{1}/_{2}\right] \end{array}$	1—1 — 1—0 2—1
4603,755 4597,673 4571,786 4566,983 4538,942	60 10 15 15 30	13,31 13,17 14,84 16,21	16,01 15,88 17,55 18,94	$\begin{array}{c} 6s \ [1^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ - \\ 5d \ [1^{1}/_{2}]^{\circ} - 6p \ [2^{1}/_{2}] \\ 5d' \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 6d \ [1^{1}/_{2}]^{\circ} \end{array}$	2—3 — 1—2 2—1 2—2
4526 ,725 4525 ,59 4522 ,846 4515 ,495 4506 ,834	35 2 15 10 10	13,38 — — 13,14 16,12	16,12 — — 15,88 18,86	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1—1 — — 3—2 1—1
4506,705 4501,525 4493,660 4459,185 4457,680	15 35 10 15 15	13,75 	- 16,51 - 20,56 16,12	$\begin{array}{c} - \\ 5d \ [1^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ - \\ 6p' \ [1^{1}/_{2}] - 165813^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \end{array}$	1-0 - 2-1 0-1
4453,44 4450,785 4444,004 4436,06 4435,708	15 2 10 2 20	17,78 13,43 — 16,21	20,56 16,21 — 19,00	$6p' [1^{1}/_{2}] - 165843^{\circ}$ $5d [1^{1}/_{2}]^{\circ} - 6p [1^{1}/_{2}]$ -0 $6p [1^{1}/_{2}] - 6d [2^{1}/_{2}]^{\circ}$?	2-1 2-2 - 2-2 -
4424,046 4410,208 4405,253 4403,854 4399,495	10 20 35 20 20	13,31 — 15,68 — 17,78	$ \begin{array}{r} 16,12 \\ \hline 18,50 \\ \hline 20,59 \end{array} $	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—1 — 1—2 — 2—3
4396,909 4388,764 4386,566	15	17,78 17,77 16,21	20,60 20,60 19,04	6p' [1 ¹ / ₂]—166131° 6p' [¹ / ₂]—166131° 6p [1 ¹ / ₂]—6d [2 ¹ / ₂]°?	2—2 1—2 2—3

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λ, Å	I	E _H , eV	E _B , eV	Transition	J
4384,428 4373,018	25 30	16,12 13,38	18,94 16,21	$6p [1^{1}/_{2}] - 6d [1^{1}/_{2}]^{\circ}$ $6s [1^{1}/_{2}]^{\circ} - 6p [1^{1}/_{2}]$	$ \begin{array}{c} 1-2 \\ 1-2 \end{array} $
4363,69 4363,275 4356,575 4348,620 4330,239	2 50 2 2 2	17,55 16,21 14,93 14,93 15,68	20,39 19,05 17,77 17,78 18,55	$\begin{array}{c} 6p' \left[1^{1}/_{2} \right] - 164465^{\circ} \\ 6p \left[1^{1}/_{2} \right] - 6d \left[3^{1}/_{2} \right]^{\circ} ? \\ 5d' \left[2^{1}/_{2} \right]^{\circ} - 6p' \left[1^{1}/_{2} \right] \\ 5d' \left[2^{1}/_{2} \right]^{\circ} - 6p' \left[1^{1}/_{2} \right] \\ 6p \left[1^{1}/_{2} \right] - 6d \left[1^{1}/_{2} \right]^{\circ} \end{array}$	$ \begin{array}{r} 1 - 1 \\ 2 - 3 \\ 2 - 1 \\ 2 - 2 \\ 1 - 1 \end{array} $
4327,580 4316,992 4307,942 4306,48	10 2 8 10	17,55 13,14 17,78	20,41 16,01 20,65	$6p' [1^{1}/_{2}] - 164656^{\circ}$ $5d [3^{1}/_{2}]^{\circ} - 6p [2^{1}/_{2}]$ $6p' [1^{1}/_{2}] - 166600^{\circ}$	1—1 3—3 2—3 —
4300,636 4292,008 4288,350 4284,229 4277,100 4271,84	30 12 35 2 50 10	16,51 17,78 16,12 17,77 13,31	19,39 20,66 19,00 20,66 16,21	$6p [1/_2]$ —156399° $6p' [11/_2]$ —166687° $6p [11/_2]$ —6 $d [21/_2]$ °? $6p' [1/_2]$ —166687° $6s [11/_2]$ °—6 $p [11/_2]$ —	0-1 $2-2$ $1-2$ $1-2$ $2-2$ $-$
4241,973 4234,408 4232,188 4227,28	10 20 25 5	17,78 17,77 17,78	20,70 20,70 20,70	6p' [1 ¹ / ₂]—166961° 6p' [¹ / ₂]—166961° 6p' [1 ¹ / ₂]—167015° —	$ \begin{array}{c} 2-2 \\ 1-2 \\ 2-3 \\ - \end{array} $
4221,119 4220,571 4213,129 4193,198 4186,249 4158,610	15 2 30 8 5 18	16,01 14,84 14,84 — — — 17,78	18,94 17,77 17,78 — — 20,76	$6p [2^{1}/_{2}]-6d [1^{1}/_{2}]^{\circ}$ $5d' [1^{1}/_{2}]^{\circ}-6p' [1^{1}/_{2}]$ $5d' [1^{1}/_{2}]^{\circ}-6p' [1^{1}/_{2}]$ $ 6p' [1^{1}/_{2}]-167434^{\circ}$	3—2 2—1 2—2 — — 2—1
4151,267 4132,003 4121,210 4119,288 4108,232	20 10 15 8 5	17,77 16,01 17,55 —	20,76 19,00 20,56	6p' [1/2]—167434° 6p [21/2]—6d [21/2]°? 6p' [11/2]—165813° —	1—1 3—2 1—1 —
4102,01 4073,364 4068,773 4067,958 4053,956	1 8 30 30 15	13,17 16,01 17,55 17,92		$\begin{array}{c} - \\ 5d \ [^{1}/_{2}]^{\circ} - 6p \ [^{1}/_{2}] \\ 6p \ [^{2}/_{2}] - 6d \ [^{3}/_{2}]^{\circ}? \\ 6p' \ [^{1}/_{2}] - 166131^{\circ} \\ 6p' \ [^{1}/_{2}] - 169183^{\circ} \end{array}$	$ \begin{array}{c} -\\ 1-2\\ 3-3\\ 1-2\\ 0-1 \end{array} $
4047,184 4028,43 3993,863 3978,000 3967,212	20 2 4 10 4	15,88 13,14 — 17,55	18,94 16,21 20,66	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2—2 3—2 — 1—2 —
3965,187 3959,495 3925,583 3906,933 3900,09 3896,978 3870,164	25 20 25 20 4 7	15,88 13,38 15,88 15,88 16,21 15,68 17,77	19,00 16,51 19,04 19,05 19,39 18,86 20,97	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}] °? \\ 6s \ [4^{1}/_{2}] ° - 6p \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 6d \ [2^{1}/_{2}] °? \\ 6p \ [2^{1}/_{2}] - 6d \ [3^{1}/_{2}] °? \\ 6p \ [4^{1}/_{2}] - 456399 ° \\ 6p \ [1^{1}/_{2}] - 6d \ [4^{1}/_{2}] ° \\ 6p' \ [^{1}/_{2}] - 169183 ° \end{array}$	$ \begin{array}{r} 2-2 \\ 1-0 \\ 2-3 \\ 2-3 \\ 2-1 \\ 1-1 \\ 1-1 \end{array} $
3848,27 3805,412 3805,096 3785,424 3751,402	2 2 25 20 4	15,68 16,12			- 1-2 1-1 -
3734,337 3732,539 3699,20	10 4 10	15,68	19,00	6p [1/2]—6d [21/2]°?	1-2
3687,64 3680,101	4 4	17,78 17,55	21 ,14 20 , 92	6p' [1 ¹ / ₂]—170504° 6p' [1 ¹ / ₂]—168721°	$\begin{array}{c} 2-2 \\ 1-0 \end{array}$

λ, Α	I	$E_{ m H}$, eV	$E_{_{ m B}}$, eV	Transition	J
3651,073 3630,620 3618,549	4 2 2	<u> </u>	<u>-</u> 20,97	$\frac{-}{6p'}$ $\frac{-}{[4^{1}/_{2}]}$ -469483°	
3576,570 3566,11 3565,111	2 2 10	16,21 17,55	19,68 21,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$^{2-2}_{1-2}$
3559,68 3531,376	10 4	15,88	19,39	6p [2 ¹ / ₂]—156399°	2—1 2—1
3475,973 3459,185 3429,49 3396,60 3376,261	2 15 3 2 2	13,98 17,78 17,78 16,01	17,55 21,39 21,43 19,68	$5d [2^{1}/_{2}]^{\circ}$ — $6p' [1^{1}/_{2}]$ — $6p' [1^{1}/_{2}]$ — 172544° $6p' [1^{1}/_{2}]$ — 172826° $6p [2^{1}/_{2}]$ — 158717°	2—1 ———————————————————————————————————
3368,555 3345,00 3329,428 3271,626 3267,135	$\begin{array}{c} 30 \\ 2 \\ 10 \\ 20 \\ 30 \end{array}$	14,10 17,77 16,51 13,98 13,98	17,78 21,48 20,23 17,77 17,78	$\begin{array}{c} 5d \ [2^{1}/_{2}]^{\circ}-6p' \ [4^{1}/_{2}] \\ 6p' \ [^{1}/_{2}]-173244^{\circ} \\ 6p \ [^{1}/_{2}]-7s' \ [^{1}/_{2}]^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ}-6p' \ [^{1}/_{2}] \\ 5d \ [2^{1}/_{2}]^{\circ}-6p' \ [4^{1}/_{2}] \end{array}$	$ \begin{array}{c} 3-2 \\ 1-0 \\ 0-1 \\ 2-1 \\ 2-2 \end{array} $
3265,924 3263,982 3180,94 3173,355 3161,333	30 5 10 5 2	13,75 15,88 17,92 16,51 16,21	17,55 19,68 21,81 20,41 20,13	$5d [1^{1}/_{2}]^{\circ} -6p' [1^{1}/_{2}]$ $6p [2^{1}/_{2}] -158717^{\circ}$ $6p' [^{1}/_{2}] -175951^{\circ}$ $6p [^{1}/_{2}] -164656^{\circ}$ $6p [1^{1}/_{2}] -162388^{\circ}$	1-1 2-2 0-1 0-1 2-3
3154,75 3095,86 3092,31 3089,053 3084,875	4 6 10 5 5	17,55 17,55 15,33 16,12 13,75	21,48 21,55 19,34 20,13 17,77	$\begin{array}{c} 6p' \ [1^{1}/_{2}] - 173244^{\circ} \\ 6p' \ [4^{1}/_{2}] - 173837^{\circ} \\ 5d' \ [4^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 6p \ [4^{1}/_{2}] - 162352^{\circ} \\ 5d \ [4^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \end{array}$	1-0 1-1 1-1 1-0 1-1
3080,874 3078,07 3066,60 3060,976 3020,37	6 6 10 5 4	13,75 15,33 17,77 16,51 15,23	17,78 19,35 21,81 20,56 19,34	$\begin{array}{c} 5d \ [1^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 5d' [\ 1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 6p' \ [^{1}/_{2}] - 175951^{\circ} \\ 6p \ [^{1}/_{2}] - 165813^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 1-2 \\ 1-1 \\ 0-1 \\ 1-1 \end{array} $
3012,041 3006,75 3001,271 2990,85 2977,258	$\frac{8}{10}$ $\frac{2}{3}$	16,12 15,23 — 15,33 13,75	20,23 19,35 — 19,47 17,92	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-2 - 1-1 1-0
2970 ,851 2968 ,383 2949 ,800	5 5 5	$\begin{array}{c} 43,38 \\ 16,21 \\ 17,77 \\ 45,23 \end{array}$	17,55 20,39 21,97	$6s \left[\frac{11}{2}\right]^{\circ} - 6p' \left[\frac{11}{2}\right]$ $6p \left[\frac{11}{2}\right] - 1644444^{\circ}$ $6p' \left[\frac{11}{2}\right] - 10s \left[\frac{11}{2}\right]^{\circ}$	1—1 2—2 1—1 1—2
2942,25 2940,953	8 20	$\frac{(13,23)}{-13,34}$	$\frac{19,43}{-17,55}$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1
2931,09 2926,274 2914,652 2899,75 2883,745	20 1 8 8 5	15,33 13,31 15,88 16,12 16,12	19,56 17,55 20,13 20,39 20,41	$5d'$ [$1^{1}/_{2}$]° $-7p$ [$1/_{2}$] $6s$ [$1^{1}/_{2}$]° $-6p'$ [$1^{1}/_{2}$] $6p$ [$2^{1}/_{2}$] $-162388°$ $6p$ [$1^{1}/_{2}$] $-164465°$ $6p$ [$1^{1}/_{2}$] $-164656°$	1-0 2-1 2-3 1-1 1-1
2881,19 2866,37 2852,415 2848,955 2847,655	15 8 8 3 1	15,17 15,23 13,43 13,43	19,47 19,56 17,77 17,78	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0-1 $1-0$ $2-1$ $2-2$ $-$
2847,24 2846,193 2837,28 2829,423 2829,045	3 10 00 5 5	19,05 19,04 13,17 16,01	23,40 $ 23,40$ $17,55$ $20,39$	$\begin{array}{c} 6d \ [3^{1}/_{2}]^{\circ}?-188791 \\ -\\ 6d \ [2^{1}/_{2}]^{\circ}?-188791 \\ 5d \ [^{1}/_{2}]^{\circ}-6p' \ [1^{1}/_{2}] \\ 6p \ [2^{1}/_{2}]-164444^{\circ} \end{array}$	3-2 - 3-2 1-1 3-2

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λ, Ä	I	$E_{ m H}$, eV	E _B , eV	Transition	J
2827,91 2826,802 2820,268 2816,943 2799,41	00 1 5 20 10	16,21 16,21 13,38 19,00 14,93	20,59 20,60 17,77 23,40 19,35	$\begin{array}{c} 6p \ [1^{1}/_{2}] - 166117^{\circ} \\ 6p \ [1^{1}/_{2}] - 166131^{\circ} \\ 6s \ [1^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 6d \ [2^{1}/_{2}]^{\circ}? - 188791 \\ 5d' \ [2^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \end{array}$	2—3 2—2 1—1 2—2 2—2
2794,50 2793,316 2789,797 2788,24 2784,666	10 5 10 10 3	13,34 16,21 16,12	17,77 20,65 20,56	5d [1/2]°—6p' [1/2] 6p [11/2]—166600° 6p [11/2]—165843°	0-1 2-3 1-1
2780,065 2776,99 2766,095 2761,97 2757,81	3 15 5 8 7	13,31 18,94 16,12 16,21 16,21	17,77 $23,40$ $20,60$ $20,70$ $20,70$	6s [1 ¹ / ₂]°-6p' [¹ / ₂] 6d [1 ¹ / ₂]°-188791 6p [1 ¹ / ₂]-166131° 6p [1 ¹ / ₂]-166961° 6p [1 ¹ / ₂]-167015°	2—1 2—2 1—2 2—2 2—3
2749,839 2748,23 2740,73 2733,879	8 15 15 5	14,93 15,88 — 15,88	19,43 20,39 - 20,41	$5d' [2^{1}/_{2}]^{\circ}$ — $7p [1^{1}/_{2}]$ $6p [2^{1}/_{2}]$ — 164465° — $6p [2^{1}/_{2}]$ — 164656°	2-2 2-1 - 2-1
2730,065	5	18,86	23,40	$6\hat{d} \left[1^{1}/_{2}\right]^{\circ} - 188791$	1—2
2726,802 2726,30 2724,21 2717,86 2703,95	1 0 10 1 3	15,68 16,21 16,12 16,01 16,12	20,23 $20,76$ $20,66$ $20,57$ $20,70$	$6p [1/_2] - 7s' [1/_2]^{\circ}$ $6p [41/_2] - 167434^{\circ}$ $6p [41/_2] - 166687^{\circ}$ $6p [21/_2] - 165890^{\circ}$ $6p [41/_2] - 166961^{\circ}$	$ \begin{array}{r} 1 - 1 \\ 2 - 1 \\ 1 - 2 \\ 3 - 2 \\ 1 - 2 \end{array} $
2701,19 2689,412 2686,60 2673,24 2671,17	4 5 10 6 4	16,01 13,17 16,51 14,84 19,05	20,59 17,78 21,12 19,47 23,69	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 166117^{\circ} \\ 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [1^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 170363^{\circ} \\ 5d' \ [1^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 6d \ [3^{1}/_{2}]^{\circ}? - 191103 \end{array}$	3-3 1-2 0-1 2-1 3-3
2669,792 2666,358 2662,62 2660,24 2651,71	10 1 1 5 12	{ 19,04 16,12 16,01 19,04 16,01 19,00	23,68 20,76 20,65 23,69 20,66 23,68	6d [2 ¹ / ₂]°?—191002 6p [1 ¹ / ₂]—167434° 6p [2 ¹ / ₂]—166600° 6d [2 ¹ / ₂]°?—191103 6p [2 ¹ / ₂]—166687° 6d [2 ¹ / ₂]°?—191002	3-2 1-1 3-3 3-3 3-2 2-2
2648,07 2644,69 2640,92 2637,14 2635,882	10 5 3 8 1	15,88 19,00 15,88 16,01 16,01 15,68	20,56 23,69 20,57 20,70 20,70 20,39	$6p [2^{1}/_{2}]$ — 165843° $6d [2^{1}/_{2}]^{\circ}$?— 191103 $6p [2^{1}/_{2}]$ — 165890° $6p [2^{1}/_{2}]$ — 166961° $6p [2^{1}/_{2}]$ — 167015° $6p [1/_{2}]$ — 164444°	2-1 2-3 2-2 3-2 3-3 1-2
2628,86 2627,952 2616,27 2610,140 2609,44	2 5 10 1 15	15,88 15,88 18,94 13,17 18,94	20,59 20,60 23,68 17,92 23,69	$\begin{array}{c} 6p \ [2^{1}/_{2}] - 166117^{\circ} \\ 6p \ [2^{1}/_{2}] - 166131^{\circ} \\ 6d \ [1^{1}/_{2}]^{\circ} - 191002 \\ 5d \ [^{1}/_{2}]^{\circ} - 6p' \ [^{1}/_{2}] \\ 6d \ [1^{1}/_{2}]^{\circ} - 191103 \end{array}$	$ \begin{array}{r} 2-3 \\ 2-2 \\ 2-2 \\ 4-0 \\ 2-3 \end{array} $
2595,886 2590,09 2581,05 2576,74 2575,07	$\begin{array}{c} 3 \\ 10 \\ 0 \\ 10 \\ 3 \end{array}$	15,88 15,88 16,12 19,05 16,21	20,65 20,66 20,92 23,86 21,02	6p [2 ¹ / ₂]—166600° 6p [2 ¹ / ₂]—166687° 6p [1 ¹ / ₂]—168721° 6d [3 ¹ / ₂]°?—192475 6p [1 ¹ / ₂]—169588°	$ \begin{array}{r} 2-3 \\ 2-2 \\ 1-0 \\ 3-2 \\ 2-2 \end{array} $
2574,54 2573,03 2571,79 2568,69 2568,17	10 30 2 15 10	18,86 19,05 15,88 19,04 15,88	23,68 23,87 20,70 23,86 20,70	6d [1 ¹ / ₂]°—191002 6d [3 ¹ / ₂]°?—192530 6p [2 ¹ / ₂]—166961° 6d [2 ¹ / ₂]°?—192475 6p [2 ¹ / ₂]—167015°	1-2 3-3 2-2 3-2 2-3
2565,02 2552,00	1 2	19,04 19,00	23 ,87 23 ,86	6d [2 ¹ / ₂]°?—192530 6d [2 ¹ / ₂]°?—192475	3—3 2—2

λ, Å	I	E_{H} , eV	E _B , eV	Transition	J
2551 ,17 2550 ,65 2548 ,43	10 7 2	18,55 16,12 19,00	23,40 20,97 23,87	6d [1/2]°—188791 6p [11/2]—169183° 6d [21/2]°?—192530	$ \begin{array}{c} 1-2 \\ 1-1 \\ 2-3 \end{array} $
2542 ,18 2540 ,83 2539 ,174	1 3 5	15,68 15,88	20,56 20,76	6p [1/2]—165843° 6p [21/2]—167434°	1—1 2—1 —
2539,08 2524,64	10 0	19,00 16,21	23,89 21,12	6d [2 ¹ / ₂]°?—192675 6p [1 ¹ / ₂]—170363°	2—1 2—1
2523,66 2519,17	4 00	15,68 18,94 (18,94	20,60 23,86 23,87	6p [1/2]—166131° 6d [11/2]°—192475 6d [11/2]°—192530	$\begin{array}{c} 1-2 \\ 2-2 \\ 2-3 \end{array}$
2515 ,72 2506 ,53 2488 ,74	10 1 1	16,21 18,94 15,68	21,14 23,89 20,66	6p [1 ¹ / ₂]—170504° 6d [1 ¹ / ₂]°—192675 6p [¹ / ₂]—166687°	$\begin{array}{c} 2-2 \\ 2-1 \\ 1-2 \end{array}$
2480,41 2476,07 2471,88 2469,58 2468,12	6 10 1 0 3	18,86 16,12 15,68 16,01 18,86	23,86 21,12 20,70 21,02 23,89	6d [1 ¹ / ₂]°—192475 6p [1 ¹ / ₂]—170363° 6p [1 ¹ / ₂]—166961° 6p [2 ¹ / ₂]—169588° 6d [1 ¹ / ₂]°—192675	$ \begin{array}{r} 1-2 \\ 1-1 \\ 1-2 \\ 3-2 \\ 1-1 \end{array} $
2457 ,32 2443 ,24 2432 ,71	1 5 5	16,51 15,68 15,88 15,55	21,55 20,76 20,97 23,68	6p [1/2]—173837° 6p [1/2]—167434° 6p [21/2]—169183° 6d [1/2]°—191002	0-1 $1-1$ $2-1$ $1-2$
2414,89 $2408,96$	8 0	16,01 15,88	21,14 21,02	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 3-2 \\ 2-2 \end{array}$
2392,86 2376,80 2368,75	15 0 0	16,21 16,21 15,68	21,39 21,43 20,92	$6p [1^{1}/_{2}]-172544^{\circ}$ $6p [1^{1}/_{2}]-172826^{\circ}$ $6p [1^{1}/_{2}]-168721^{\circ}$ $6p [2^{1}/_{2}]-170363^{\circ}$	$ \begin{array}{r} 2-3 \\ 2-3 \\ 1-0 \\ 2-1 \end{array} $
2364 ,81 2357 ,85	10 5	15,88 14,10	21,12 19,35	$5d [2^{1}/2] = 170505$ $5d [2^{1}/2] = -7p [2^{1}/2]$ $6p [2^{1}/2] = 170504^{\circ}$	$ \begin{array}{c} 2 - 1 \\ 3 - 2 \\ 2 - 2 \end{array} $
2356,95 2354,44 2343,13	$egin{array}{c} 0 \ 10 \ 8 \end{array}$	15,88 15,33 15,68	21,14 20,59 20,97	$\begin{array}{c} 6p \left[\frac{2}{2}\right] = 176364 \\ 5d' \left[\frac{1}{2}\right] = -7p' \left[\frac{1}{2}\right] \\ 6p \left[\frac{1}{2}\right] = 169183^{\circ} \\ 6p \left[\frac{1}{2}\right] = 175951^{\circ} \end{array}$	1—1 1—1
2335,90	00	{ 16,51 14,10 { 18,55	21 ,81 19 ,40 23 ,89	5d [2 ¹ / ₂]°—7p [2 ¹ / ₂] 6d [¹ / ₂]°—192675	0—1 3—3 1—1
2321,07	10	$\left\{\begin{array}{c}15,68\\16,21\end{array}\right.$	21 ,02 21 ,55	6p [1/ ₂]—169588° 6p [11/ ₂]—173837°	1—2 2—1
2315,68 2312,47 2311,16 2307,71	6 0 0 5	13,98 15,23 16,12 13,98 16,01	19,34 20,59 21,48 19,35 21,43	$\begin{array}{c} 5d \ [2^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 173244^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] - 172826^{\circ} \end{array}$	2-1 1-1 1-0 2-2 3-3
2286,68 2281,50 2280,02 2279,96	$\begin{array}{c} 00 \\ 2 \\ 2 \end{array}$	13,98 15,33 15,68 16,12	19,40 20,76 21,12 21,55	$5d [2^{1}/_{2}]^{\circ} -7p [2^{1}/_{2}]$ $5d' [1^{1}/_{2}]^{\circ} -7p' [1/_{2}]$ $6p [1/_{2}] -170363^{\circ}$ $6p [1^{1}/_{2}] -173837^{\circ}$	2—3 1—1 1—1 1—1
2273 ,98 2273 ,83	$\begin{array}{c} \overline{0} \\ 20 \end{array}$	13,98 19,05	$19,43 \\ 24,50$	$5d [2^{1}/_{2}]^{\circ} -7p [1^{1}/_{2}]$ $6d [3^{1}/_{2}]^{\circ}? -197642$	2—2 3—3
2272,76 2267,61 2267,29 2258,35 2257,82	0 20 3 5 12	15,68 19,04 16,51 13,98 13,91	21 ,14 24 ,50 21 ,97 19 ,47 19 ,40	$\begin{array}{c} 6p \ [^{1}/_{2}] - 170504^{\circ} \\ 6d \ [2^{1}/_{2}]^{\circ}? - 197642 \\ 6p \ [^{1}/_{2}] - 10s \ [1^{1}/_{2}]^{\circ} \\ 5d \ [2^{1}/_{2}]^{\circ} - 7p \ [1^{1}/_{2}] \\ 5d \ [3^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1-2 \\ 3-3 \\ 0-1 \\ 2-1 \\ 4-3 \end{array} $
2254,58 2248,80 2242,05 2234,57 2228,88	15 0 2 0 10	19,00 15,88 15,23 15,88 18,94	24,50 21,39 20,76 21,43 24,50	$\begin{array}{c} 6d \ [2^{1}/_{2}]^{\circ}?-197642 \\ 6p \ [2^{1}/_{2}]-172544^{\circ} \\ 6s' \ [^{1}/_{2}]^{\circ}-7p' \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}]-172826^{\circ} \\ 6d \ [1^{1}/_{2}]^{\circ}-197642 \end{array}$	2-3 2-3 1-1 2-3 2-3

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	λ, Å	1	$E_{ m H}^{}$, eV	$E_{\rm B},~{\rm eV}$	Transition	J
	2227,01 2220,51 2217,91 2213,15 2212,40	00 9 3 5 0	15,33 13,75 15,17 13,75 16,21	20,89 19,34 20,76 19,35 21,81	$\begin{array}{c} 5d' \ [1^{1}/_{2}]^{\circ} - 7p' \ [1^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 6s' \ [^{1}/_{2}]^{\circ} - 7p' \ [^{1}/_{2}] \\ 5d \ [1^{1}/_{2}]^{\circ} - 7p \ [2^{1}/_{2}] \\ 6p \ [1^{1}/_{2}] - 175951^{\circ} \end{array}$	1-2 $1-1$ $0-1$ $1-2$ $2-1$
	2189 ,47 2187 ,87 2182 ,14 2179 ,60 2177 ,61	10 3 5 10 3	15,23 14,93 13,75 —	20,89 20,59 19,43 —	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-2 2-1 1-2 -
	2167,70 2153,06 2146,75 2139,48	$\begin{array}{c} 3 \\ 0 \\ 10 \\ 2 \end{array}$	13,75 14,84 — 15,68	19,47 20,59 — 21,48	$5d [1^{1}/_{2}]^{\circ} -7p [1^{1}/_{2}]$ $5d' [1^{1}/_{2}]^{\circ} -7p' [1^{1}/_{2}]$ $ 6p [^{1}/_{2}] -173244^{\circ}$	1-1 2-1 - 1-0
	2136 ,17	3	13,75	19,56	$5d \left[1^{1}/_{2}\right]^{\circ} - 7p \left[1/_{2}\right]$	1— 0
	2133,77 2124,80 2122,27 2115,55 2112,65	0 0 1 0 5	19,04 14,93 19,00 16,12 15,68	24,84 20,76 24,84 21,97 21,55	$\begin{array}{c} 6d \ [2^{1}/_{2}]^{\circ}? -200406 \\ 5d' \ [2^{1}/_{2}]^{\circ} -7p' \ [^{1}/_{2}] \\ 6d \ [2^{1}/_{2}]^{\circ}? -200406 \\ 6p \ [1^{1}/_{2}] -10s \ [1^{1}/_{2}]^{\circ} \\ 6p \ [^{1}/_{2}] -173837^{\circ} \end{array}$	3-3 2-1 2-3 1-1 1-1
	2099,50 2097,52 2091,97 2088,71 2080,05	4 0 8 8 8	18,94 13,43 14,84 15,88 13,38	24,84 19,34 20,76 21,81 19,34	$\begin{array}{c} 6d \ [1^{1}/_{2}]^{\circ} -200406 \\ 5d \ [1^{1}/_{2}]^{\circ} -7p \ [^{1}/_{2}] \\ 5d' \ [1^{1}/_{2}]^{\circ} -7p' \ [^{1}/_{2}] \\ 6p \ [2^{1}/_{2}] -175951^{\circ} \\ 6s \ [1^{1}/_{2}]^{\circ} -7p \ [^{1}/_{2}] \end{array}$	2-3 2-1 2-1 2-1 1-1
	2077,43 2073,60 2063,13 2058,10 2051,75	8 1 00 3 0	14,93 13,43 13,43 13,31 13,31	20,89 19,40 19,43 19,34 19,35	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2-2 2-3 2-2 2-1 2-2
	2046,25 2046,00 2035,15 2033,78 2025,05	00 00 7 0 5	13,38 14,84 13,31 15,88 13,31	19,43 20,89 19,40 21,97 19,43	$\begin{array}{c} 6s \left[1^{1}/_{2}\right]^{\circ} - 7p \left[1^{1}/_{2}\right] \\ 5d' \left[1^{1}/_{2}\right]^{\circ} - 7p' \left[1^{1}/_{2}\right] \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 7p \left[2^{1}/_{2}\right] \\ 6p \left[2^{1}/_{2}\right] - 10s \left[1^{1}/_{2}\right]^{\circ} \\ 6s \left[1^{1}/_{2}\right]^{\circ} - 7p \left[1^{1}/_{2}\right] \end{array}$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-3 \\ 2-1 \\ 2-2 \end{array} $
	2022,29 2005,83 1971,57 1968,21 1966,91	$\begin{array}{c} 0 \\ 00 \\ 3 \\ 2 \\ 2 \end{array}$	15,68 13,38 15,68 13,14 13,17	21,81 19,56 21,97 19,43 19,47	$\begin{array}{c} 6p \ [^{1}/_{2}] - 175951^{\circ} \\ 6s \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 6p \ [^{1}/_{2}] - 10s \ [^{1}/_{2}]^{\circ} \\ 5d \ [^{3}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \\ 5d \ [^{1}/_{2}]^{\circ} - 7p \ [^{1}/_{2}] \end{array}$	$ \begin{array}{r} 1 - 1 \\ 1 - 0 \\ 1 - 1 \\ 3 - 2 \\ 1 - 1 \end{array} $
:	1501 ,3 1191 ,55 1178 ,65 926 ,75 901 ,34	5 8 10 20 20	14,10 13,98 0,00 0,00	24,50 24,50 13,38 13,75	$\begin{array}{c} - \\ 5d \ [2^{1}/_{2}]^{\circ} - 197642 \\ 5d \ [2^{1}/_{2}]^{\circ} - 197642 \\ 5p^{6} \ ^{1}S - 6s \ [1^{1}/_{2}]^{\circ} \\ 5p^{6} \ ^{1}S - 5d \ [1^{1}/_{2}]^{\circ} \end{array}$	 33 23 0-1 0-1
	813,85 808,77 668,43 657,15 639,42	20 20 12 5	00,00 0,00 0,00 0,00 0,00	15,23 15,33 18,55 18,86 19,39	$5p^{6} {}^{1}S - 6s' [^{1}/_{2}]^{\circ}$ $5p^{6} {}^{1}S - 5d' [^{1}/_{2}]^{\circ}$ $5p^{6} {}^{1}S - 6d [^{1}/_{2}]^{\circ}$ $5p^{6} {}^{1}S - 6d [^{1}/_{2}]^{\circ}$ $5p^{6} {}^{1}S - 156399^{\circ}$	0—1 0—1 0—1 0—1 0—1
	612,82 607,98 607,31 602,95 591,08	7 1 3 1 3	00, 0 00, 0 00, 0 00, 0 00, 0	20,23 20,39 20,41 20,56 20,97	$5p^{6} {}^{1}S - 7s' [{}^{1}/{}_{2}]^{\circ}$ $5p^{6} {}^{1}S - 164465^{\circ}$ $5p^{6} {}^{1}S - 164656^{\circ}$ $5p^{6} {}^{1}S - 165843^{\circ}$ $5p^{6} {}^{1}S - 169183^{\circ}$	0—1 0—1 0—1 0—1 0—1
	575,34 564,25	1 3		21,55 21,97	$5p^{6} {}^{1}S$ —173837° $5p^{6} {}^{1}S$ —10 $s [1^{1}/_{2}]^{\circ}$	0—1 0—1
	7					

Cs III, ground state $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{1_0} 4s^2 4p^6 4d^{1_0} 5s^2 5p^{5/2} P_{3/2}^9$ Ionization potential 279 000 cm⁻¹*; 34,6 eV*

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
877,9 817,9 802,8 782,6 758,9	7 1 00 3 1	1,72 1,72 1,72 0,00 1,72	15,84 16,88 17,16 15,84 18,06	$5p^{5} {}^{2}P^{\circ} - 5p^{6} {}^{2}S$ $5p^{5} {}^{2}P^{\circ} - 136146$ $5p^{5} {}^{2}P^{\circ} - 138453$ $5p^{5} {}^{2}P^{\circ} - 5p^{6} {}^{2}S$ $5p^{5} {}^{2}P^{\circ} - 145655$	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
734,5 722,2 708,4 686,5 649,4	1 2 1 0 0	0,00 0,00 1,72 0,00 1,72	16,88 17,16 19,22 18,06 20,81	$5p^{5} {}^{2}P^{\circ}$ —136146 $5p^{5} {}^{2}P^{\circ}$ —138453 $5p^{5} {}^{2}P^{\circ}$ —155040 $5p^{5} {}^{2}P^{\circ}$ —145655 $5p^{5} {}^{2}P^{\circ}$ —167872	$3/_{2}$
645,0 595,7 592,9 571,7 550,2	4 2 0 1 2		19,22 20,81 22,53 22,63 23,40 22,53	$5p^{5} {}^{2}P^{\circ}$ —155040 $5p^{5} {}^{2}P^{\circ}$ —167872 $5p^{5} {}^{2}P^{\circ}$ —181758 $5p^{5} {}^{2}P^{\circ}$ —182546 $5p^{5} {}^{2}P^{\circ}$ —188794 $5p^{5} {}^{2}P^{\circ}$ —181758	$3/_{2}$
547,8 529,7	2 0	0,00 0,00	22,63 23,40	$5p^{5} {}^{2}P^{\circ}$ —182546 $5p^{5} {}^{2}P^{\circ}$ —188794	³ / ₂ — — 3/ ₂ — —

^{*}Calculated data, see [17].

Unclassified Lines of Cesium Belonging to Cs II or Cs III [11, 12, 14, 16]

λ, Α	I	λ, Å	I	λ, Α	I
69310 Cs I? 7248,99 7229,01 7205,99	15 2 35 2	4864,24 4851,583 4835,03 4825,42	10 8 15 10	4447 ,649 4440 ,26 4397 ,994 4368 ,77	10 15 10 10
7188,32 7160,88 7149,554 7130,532 7121,18 7085,72	2 10 5 2	4804,61 4768,41 4758,92 4757,87 4733,06 4728,18	10 10 10 10 20 10	4367,66 4359,02 4335,411 4326,315 4312,778 4297,514	10 10 8 10 10
6979,681 6892,42 6825,22 6724,476 6646,564	15 2 15 15 15	4716 ,19 4674 ,89 4651 ,1 4616 ,28 4616 ,01	10 10 10 15 10	4282 ,59 4281 ,31 4272 ,87 4268 ,89 4264 ,675	10 10 10 10 50
6386 ,94 5984 ,393 5566 ,7 5507 ,174 5402 ,793	25 15 40 15 40	4610,505 4599,22 4572,611 4543,71 4534,64	10 15 10 10	4219 ,516 4173 ,533 4163 ,243 4081 ,471 4043 ,422	5 15 15 10 20
5349 ,31 5348 ,95 5209 ,44 5081 ,773 5001 ,641	15 25 15 15	4532,500 4531,45 4522,36 4496,758 4469,09	10 15 15 15 2	4039 ,841 4035 ,83 4025 ,67 4023 ,582 4014 ,99	50 15 10 10

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λ, Å	I	λ, Å	I	λ, Å	I
4010,54	10	3450,36	6	3130,7	4
4010,34			4		4
	10	3443 ,88	4	3129,1	4
4006,537	30	3430,4	4	3125,3	4
4001,682	$\frac{20}{6}$	3418,11	6	3118,35	4
3974 ,239		3411,313	10	3112 ,18	
3955,923	10	3406,626	10	3109,3	4
3929 ,46	2	3397 ,187	6	3097,38	10
3921,69	4	3393 ,25	3	3094 ,82	4
3913,37	2	3389,15	$\overset{\circ}{6}$	3091,6	4
3904,806	4	3379,0	$\ddot{6}$	3088,9	4
3900,82	4	3364,52	$\stackrel{\circ}{4}$	3072,7	4
3893,09	4	3358,8	4	3069 ,73	4
3892,206	4	3357,687	6	3067,8	4
3864,367	4	3353,88	4	3067,2	4
3864,249	6	3349,445	10	7, 3063	4
3861 ,489	4	3344,004	10	3062,7	4
3837,449	$\tilde{4}$	3340,574	10	3061,24	6
3819,61	$\overline{4}$	· ·	i i	3060,12	$\ddot{6}$
3797,908	$\mathcal{L}_{\mathbf{k}}$	3330,33	4	3058,6	6
3729,980	4	3324,5 3322,8	$\frac{4}{4}$	3056,04	6
3724,9	4	3315,498	10	3054,56	4
3710,774	$\overset{4}{4}$	3311,52	4	3054,30	4
3699,475	10	0011,02	•	3053,5	$\overset{\mathtt{q}}{4}$
3680,454	$\frac{1}{4}$	3303,72	4	3050,8	6
3661,391	6	3299,86	6	3045,9	$\overset{\circ}{4}$
3655,73	4	3282 ,1	3	3042,3	
3641,40	4	3278 ,26	4	3039,31	4 4
3641,332	5	32 7 5 ,68	4	3032,41	4
3634,75	$\overset{\circ}{6}$	3268,314	10	3032,41	4
3624,56	4	3263,06	$\overset{\circ}{4}$	3030,35	$\overset{\tau}{4}$
3622,691	6	3262,29	6	· ·	
3618,161	6	3255,35	10	3029 ,15	4
3614,989	4	3250,58	6	3028 ,25 3020 ,9	4 4
3608,285	10	2947 5	,	3015,8	4
3605,535	4	3247 ,5 3242 ,28	4 10	3002,88	6
3602 ,852		3234,16	6	1	
3600,73	8 10	3227,2	$\overset{\circ}{4}$	2999,513	8
3598 ,97	4	3219,1	$ar{4}$	2998,20	$\begin{array}{c} 8 \\ 2 \\ 2 \end{array}$
3597,73	6	ļ		$2997,2 \\ 2996,15$	$\overset{2}{2}$
3597,430	10	3213 ,7	6	2995,34	20
•		3209,65	10	· · · · · · · · · · · · · · · · · · ·	
3592 ,48 3581 ,3	4 4	3207,07	$\frac{4}{4}$	2986,89	2
3573,24	4	3204,27 $3201,09$	4	2985,3	2
3569,28	4	0201,08	'1	2983 ,91 2982 ,5	<u> </u>
3541,45	$\overset{\tau}{4}$	3198 ,7	4	2982,3	2 2 2 2
		3195,5	4	,	4
3533,364	6	3193,6	4	81, 2976	2
3518, 15	6	3192,1	4	2975,65	2
3516,03	$\frac{4}{6}$	3189,20	4	2975 ,13	2 2 2 2
3514,022	4	3178,61	10	2972 ,8	
3504,85	'±	3172,56	10	0, 2969	8
3503,67	4	3169,73	4	2965 ,4	2.
3479,25	4	3153,88	$\hat{6}$	2965,0	8
3470,92	4	3152,30	6	2962,8	$\check{\tilde{2}}$
3469 ,81	4		0	2962,4	2 8 2 2 2
3465,20	4	3151,14	6	2951 ,59	2
3463,425	6	3149,36	10	1	
3457 ,18	4	3145,2 3141,46	4	2947,85	2
3455,48	4	3134,40	4 4	2944,1	20
0.100,10	•	- 010±,0	**	2938,5	20

λ, Å	I	λ,	1	λ, Å	I
2924 ,48 2922 ,21	2 2	2721,6 2719,0	2	2483 ,0 2480 ,7	2 2
·		2715,8	2 2 2 2	·	
2921 ,83 2921 ,03	$\frac{2}{20}$	2714,0	2	$2477,58 \ 2466,8$	$\frac{20}{2}$
2915,24	$\overset{20}{2}$	2711,6	2	2466,3	$\frac{1}{2}$
2910,82	2 2	2710,5	2	2462,0	$egin{array}{c} 2 \ 2 \ 2 \end{array}$
2906 ,17	2	$2709,0 \\ 2706,79$	$\frac{2}{20}$	2459,23	
2901,1	$\frac{2}{2}$	2705,3	$\frac{20}{2}$	2455,80	8 2 2 2 8
2895 ,32 2894 ,85	$\frac{2}{2}$	2704,1	2	$2443,2 \\ 2439,8$	$\frac{2}{2}$
2893 ,81	$ar{rac{2}{2}}$	2700,30	8	2437 ,1	$\overline{2}$
2891,75	2	2699,16	8	2432,6	8
2886,67	20	2691 ,83 2681 ,99	2 8	2427 ,65	20
2884,42	8	2681,34	8	2426 ,41 2425 ,15	$\begin{matrix} 8 \\ 20 \end{matrix}$
2879,25 $2877,29$	8 8	2678,92	20	2423,13	$\frac{20}{2}$
2875,30	8	2677,01	$\overset{20}{2}$	2421,4	$\frac{2}{2}$
2872 ,35	8	2674,62	2	2420,06	2.
2871,32	2	$2674,0 \\ 2668,76$	$\frac{2}{8}$	2415,0	$\frac{2}{2}$
2868,33	8	[[2414,77	2
2866 ,90 2865 ,45	$rac{2}{2}$	2658,71	$rac{2}{2}$	2411 ,98 2406 ,9	2 2 2 2 2
		$ \begin{array}{c} 2656,83 \\ 2650,7 \end{array} $	$2\overset{2}{0}$	·	
2862 ,40	8 8	2646,20	-š	2401 ,7 2396 ,86	2 2 2 2
$2860,85 \\ 2859,32$	20	2642,63	20	2394,92	$\bar{2}$
2857,83	2	2641,0	2	2393,6	2
2854,45	8	2637,6	$\frac{2}{2}$	2390,02	4
2851,23	20	$ \begin{array}{c} 2634,17 \\ 2627,84 \end{array} $	8	2387,26	3
2850,4	2	2621,1	$\overset{\circ}{2}$	$\begin{array}{ccc} 2380,15 \\ 12379,54 \end{array}$	3 2 2
2845 ,67 2844 ,48	20	2619,22	2	2379,34	$\frac{2}{2}$
2841,5	$rac{2}{2}$	2614,62	8	2373,4	2
	20	2613,6	$\frac{2}{2}$	2364,827	2
2838 ,09 2835 ,01	8	2612,1 2605,40	$2\overset{2}{0}$	2359,23	2
2824,12	8	2603,72	2	2357,9	2
2823,03	8 2	2600,36	20	2356 ,12 2354 ,42	2 2
2819 ,28		2598 ,7	2		
2817,98	$\frac{20}{2}$	2596 ,95 2591 ,17	20 20	2351 ,911 2351 ,74	$\frac{2}{8}$
2815,33 2810,82	$2\overset{2}{0}$	1		2344,38	4
2809 ,91	8	2589,3 2582,5	2 2 8	2340,47	$\frac{1}{2}$
2792 ,16	8	2560,37	8	2337 ,88	
2788,81	2 8	2554,8	$rac{2}{2}$	2332,42	8
2787,02	8	2546,1		2321 ,1 2284 ,60	6 2 2 3
2784,10	8 2	2543,92	$\frac{20}{2}$	2272,79	$\frac{2}{2}$
$2780,81 \\ 2779,9$	8	2538,67 2533,44	20	2256,10	3
		2528,8	8	2246,56	2
2779 ,1 2774 ,46	8 8	2525 ,68	20	2233,28	$\bar{3}$
2774,40 $2769,5$	2	2520,8	2	2229 ,12	2 3 5 2 3
2764,42	20	2512,1	2 Q	2211,30 2209,61	2 3
2755,20	20	2511,51 2502,2	2 8 2 2	1	
2751,11	2	2496,9	$\overline{f 2}$	2200,68	8 6 3 3 5
2734,85	$\frac{2}{2}$	2495,04	20	2197 ,15 2187 ,88	3
$2731,8 \\ 2727,80$	2 2 2 2	2489,5	2	2186,31	3
2723,95	8	2485,42	20	2182 ,13	5

	_	•			
λ, Å	I	λ, Ā	I	λ, Α	I
2163 ,54	8	1981 ,5	1	1910 ,2	0
2141 ,30	10	1976 ,8	1	1908 ,1	1
2131 ,85	10	1974 ,5	1	1900 ,7	1
2127 ,69	6	1962 ,3	0	1897 ,7	0
2109 ,11	6	1961 ,4	2	1897 ,1	0
2101 ,49	8	1955 ,3	1	1896 ,8	0
2091 ,83	8	1945 ,1	1	1889 ,2	6
2083 ,75	8	1942 ,3	4	1884 ,0	6
2083 ,01	7	1941 ,2	0	1877 ,6	1
2077 ,14	8	1938 ,8	2	1873 ,2	2
2076 ,29	8	1937,4	1	1861 ,3	0
2058 ,47	3	1936,0	0	1859 ,3	2
2058 ,00	1	1935,2	8	1840 ,6	2
2057 ,61	3	1930,9	1	1675 ,5	1
2056 ,30	4	1925,0	0	1673 ,2	1
1996 ,5 1991 ,9 1990 ,1 1985 ,1 1983 ,7	5 1 1 1	1923 ,4 1920 ,0 1919 ,3 1915 ,6 1914 .6	2 1 1 3 4	1669 ,5	1

Section IV Summary Table of Spectral Lines Arranged According to Wavelength

Symbol	I	λ	Symbol	I
H H H		24470 .02 24464 .66	Cl I Li I	100 6
Na I Na I	40 30	24448 ,5 24373	Ne I Cs I	36 20 9,5
K I K I H	10 10 —	24292 ,17	Kr I	95 38 28
K I H	10 20	24248 ,9 24248	Ne I Cs I	$\frac{32}{80}$
Na I Cs I Cs I	10	24146,23	Cl I	25 4 11
Cs I? Cs I	15 15	23978 ,4 23966 ,68	Ne I Ar I	68 30
ΚI	10	23956 ,2 23956 ,10	Cl I	47 11
K I H	$\frac{\overline{20}}{3}$	23951 ,3 23882 ,69 23845 ,13	Cl I Ar I	119 18 56
H	120	23709 ,4 23636 ,3	Ne I	62 205
K I Cs I	60 30	23565 ,6 23502 ,37 23379 ,13	Kr I	$rac{40}{17} \ 240$
ΚI	10	23372 ,1	Ne I	62 237
К I К I	30 30	23340 ,44 23340	Kr I Cs I	65 50 45
Cs I	20	23195,5	Xe I	10 35
K I K I	40 80	23133 ,22 23101 ,0	Ar I Ne I	35 62 17
Cs I Cs I Cs I	30 3	23032	Cs I	15 0,2
К I К I	10 20	22909 22906,56	Cs I C I	0,6 1
Xe I	30	22891,90 22810 22721,74	Cl I Cs I Cl I	4 10 5
Xe I H	60 40	22688 ,70	Cl I	12 15
CI	1 1	22651 ,30 22625 ,51	Ca I Ca I	$\frac{30}{20}$
C I C I Ar I	$1 \\ 1 \\ 65$	22529 ,7	Ne I	105 6
Ar I Cl I	35 6 70	22485 ,79 22468 ,4	Kr I Ne I	38 8 15
Kr I Ar I Cl I	23 6	22288 ,52	Cl I	9 12
Ne I	7	22243,3	Ar I	10
	H H H Na I Na I K I K I K I K I K I Cs I Cs I Cs I Cs I K I K I K I K I K I K I K I K I K I K	H — HI — Na I — AO NA I —	H — 24470.02 HI 3 24464,66 H — 24458,7 Na I 40 24436,4 K I 10 24366,4 K I 10 24292,17 H — 20 24248,9 VA I 10 24161,5 CS I 10 24146,23 CS I 13 24097,8 CS I 15 23978,4 CS I 15 23978,4 CS I 15 23966,68 K I 10 23956,2 K I 10 23956,2 K I 10 23956,2 K I 10 23956,10 K I 20 23951,3 CS I 4 23709,4 H 120 Na I 80 23565,6 CS I 10 23565,6 CS I 10 23348,44 K I 30 23349,44 K I 30 23349,44 K I 30 23349,44 K I 30 23340,44 K I 30 23260,7 CS I 22 23038,78 CS I 32 2949 K I 40 22909 K I 40 22909 K I 50 22906,56 C I 1 22662,5 C I 1 22625,51 C I 1 22668,49 C I 1 6 22468,4 C I 1 6 22428,2 C 22428,2 C 22428,2	H — 24470.02 Cl I H — 24464,66 Li I H — 24464,66 Li I H — 24464,66 Li I H — 24458.7 Ne I Na I 30 24448,5 Ne I 24448,5 Ne I S

λ	Symbol	I	λ	Symbol	I
22062,71 22056,44 22039,57 22026,68 21902,34 21900,51 21879,35 21830,38 21819,69 21779,77 21707,4 21655,2 21582,40 21534,16 21432,11 21368,91 21354,24 21333,27 21259,89 21211,55 21191,41 21165,46 21163,75 21132,04 21121,31 21120,04 21040,9 20986,10 20917,13 201121,31 21120,04 21040,9 20986,10 20917,13 20811,14 20733,35 20725,44 20647,17 20616,21 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 20581,30 20568,5 20423,97 20419,00 20370,12 2059,87 20199,36 20140 20069,6 20025,90 19965,75 19961,37 19944,8 19928,88 19916,34 19881,75 19815,14	Si I Na I Na I Na I Ar I Cl I Cl I Si I H Cl I Mg II Mg II Mg II Ar I Ar I Cl I Ar I Ar I Ar I Ar I Cl I Ar I Cr I Ar I A	1 300 9 40 14 2250 8 10 5 9 25 13 12 58 5 7 21 15 8 2 4 319 13 40 150 150 12 27 155 12 22 11 56 16 356 10000 8 142 1 85 10 23 6 84 227 6 7 7 100 31 500 250 75 30 1,3	19727,33 19722,50 19721,99 19624 19574,0 19543,13 19508,13 19506,12 19505,62 19493,38 19452,82 19443,27 19430 19385,94 19370,30 19309,43 19283,29 19274,78 19114,83 19089,37 19045,86 19021,39 19030,79 18971,55 18969,71 18926,54 18924,96 18914,48 18844,42 18797,59 18788,0 18787,73 18785,45 18751,1 18751,01 18746,0 18744,3 18742,79 18703,09 18703,09 18703,09 18703,09 18703,09 18703,09 18695,91 18685,96 18670,00 18658,16 18672,79 1873,09 18703,09 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00 18658,16 18670,00	Al I Si I Cs I Ne I Ne I Si I Ca	18 110 23 0,2 10 65 14 500 13 1500 68 3 1500 68 3 1500 68 3 1500 68 3 1500 69 4 5 10 37 700 22 700 700 22 26 7 1500 43 13 20 25 13 30 20 84 8 6
19800 19776 ,67 19766 ,78 19755 ,28	Cs I Ca I Cl I Cl I	1 ,7 2000 185 717	18541 ,37 18475 ,79 18465 ,25 18458 ,58	Cl I Ne I Na I Ne I	74 3 2 10

18429.27						<u> </u>
18427,68	λ	Symbol	I	λ	Symbol	I
17767,65 Cl I 7 16750,56 Al I 12 17717,72 Mg II 15 16739,84 Ar I 5	18427,68 18422,72 18422,43 18418,82 18417,91 18403,16 18390,10 18385,17 18382,27 18359,21 18320,67 18304,00 18282,58 18276,59 18251,58 18243,63 18240,54 18229,66 18229 18226,57 18221,12 18220,76 18210,56 18199,13 18194 18184,43 18171,60 18169,74 18167,12 18139,80 18116,27 18108,61 18098,46 18098,46 18098,46 18098,46 18035,49 18049,56 18034,86 18035,49 18030,47 18029,95 18021,21 18001,71 17979,89 17966,12 17959,24 17936,55 17925,70 17918,38 17918,06 17914,43 17887,35 17878,26 17852,09 17842,70 17826,33 17878,27 17878,27 17770,21	Ar I Si I Ne	26 7 110 4 27 60 180 160 40 6 8 140 200 260 11 22 13 60 5 10 8 15 32 8 7 15 13 13 1500 13 6 12 10 130 33 5 20 2 30 23 400 51 2 3 17 8 4 7 10 15 100 10 270 4 5 61 3 8 4	17637, 38 17636, 83 17636, 83 17630, 44 17617, 00 17616, 57 17586, 44 17584, 86 17551, 6 17549 17546, 05 17531, 99 17519, 72 17516, 58 17505, 64 17480, 41 17474, 16 17455, 97 17448, 60 17444, 93 17443, 93 17436, 22 17429, 23 17417 17404, 67 17385, 13 17367, 55 17323, 51 17327, 29 17326, 86 17327, 29 17326, 86 17327, 29 17326, 86 17327, 29 17326, 86 17327, 29 17326, 86 17327, 29 17324, 48 17230, 21 17226, 30 17219, 55 17119, 13 17108, 66 17070, 04 17046, 8 17015 17003, 15 17003, 15 17002, 38 16941, 45 16940, 39 16935, 71 16896, 58 16890, 40 16871, 76 16853, 45 16813, 82 16800, 73 16784, 65 16763, 36	CI NI KrI SiI KrI CII NI CSII NI CSII NI CSII KrI KrI KrI CSII KrI KrI KrI KrI KrI KrI KrI KrI KrI K	3 8 4 9 37 60 100 20 4 7 18 4 125 3 27 32 2 11 128 46 24 16 4 32 12 360 23 10 28 16 5 2 6 4 3 11 2 8 30 27 10 28 10 28 10 28 10 27 10 28 10 10 10 10 10 10 10 10 10 10 10 10 10
·	47767,65	Mg~II	15	16739 ,84	Ar I	5

λ	Symbol	ı	λ	Symbol	I
16726 ,48 16718 ,96 16680 ,77	Kr I Al I Si I	70 11 29	15869 ,63 15833 ,58 15823 ,40	Cl I Si I Kr I	2780 7 2
16671 ,38 16653 16624 ,76	Cl I Cu I Cl I	55 4 4	15820 ,10 15818 ,41 15816 ,64	Kr I Cl I Ar I	35 193 16
16573 ,10 16549 ,81 16540	Kr l Ar I Cs I	16 6 4	15808 ,54 15792 ,00 15771 ,44	Cl I Cl I Kr I	25 21 1
16520 ,14 16465 ,29	Ar I Kr I	9 15	15771,144 15771,10 15765,84 15748,99	N I Mg I Mg I	22 10 8
16436 ,92 16388 ,85 16385 ,70	Ar I Na I Cl I	18 27 7	15740 ,71 15730 ,06	Mg I Cl I	6 1487
16381 ,55 16380 ,12 16373 ,85	Si I Si I Na I	16 8 30	15717,70 15688,86 15680,94	Cl I N I Kr I	4 54 75
16347,31 16315,58 16293,39	Kr I Kr I Cl I	5 12 15	15668,64 15634,98 15615,16	Cl I Kr I Cl I	7 7 7
16286 ,18 16284 ,18	Cl I Cl I Si I	39 7 7	15608,08 15582,27 15580,66	Cl I N I Cl I	18 200 5
16241 ,84 16215 ,68 16214 ,99	Si I Cl I	11 10	15557,81 15520,29 15496,13	Si I Cl I N I	7 1094 34
16202 ,94 16198 ,47 16195 ,33	Ca I Cl I Ca I	10 259 150	15477 ,78 15474 ,02 15467 ,59	Cl I Kr I Cl I	15 65
16189 ,88 16179 ,12 16163 ,71	Cl I Cl I Si I	14 10 60	15467,39 15465,07 15435,14 15433,63	Cl I Cl I Cl I Kr I	169 381 27 4
16156 ,04 16149 ,79 16135 ,80	Ca I Ca I Ca I	100 70 20	15418 ,01 15416 ,07	Xe I Cl I	110 32
16122 ,97 16109 ,46	Ar I Kr I	27 3	15402,58 15382,31 15373,88	Ar I Cl I Cl I	10 17 23
16094,80 16077,62 16067,35	Si I Cl I Cl I	20 129 10	15371 ,89 15353 ,51 15351 ,42	Kr I Ar I Cl I	$\begin{array}{c} 350 \\ 2 \\ 2 \end{array}$
16060 ,41 16060 ,03 16052 ,31 16052 ,02	Cl I Si I Kr I Xe I	10 95 2 50	15349 ,52 15335 ,29	Ar I Kr I	10 850
16024,95 16021,64 16008	Cl I C I Cu I	25 3 5	15329 ,56 15326 ,87 15320 ,46	Ar I Kr I Cl I	5 35 7
16004,81 15989,34 15970,49	C I Ar I Cl I	$\begin{bmatrix} 2\\20\\283 \end{bmatrix}$	15309,08 15302,26 15296,83	Cl I Ar I Cl I	28 7 5 8
15960 ,04 15959 ,97 15928 ,92	Si I Cl I Cl I	40 735 342	15262 ,98 15239 ,85 15234 ,4	Cl I Kr I Ne I	$ \begin{array}{c} 150 \\ 900 \\ 2 \end{array} $
15925 ,64 15899 ,93 15890 ,52	Kr I Ar I Kr I	6 20 25	15225,72 15209,52 15203,46	Cl I Kr I Cl I	13 42
15888 ,39 15884 ,41 15883 ,34	Si I Si I Cl I	190 5 277	15203,46 15199,65 15183,97 15181,94	Cl I Cl I Cl I	15 22 8 5
15883 ,21	År I	50	15172,33	Ar I	22

	1	1	II		
λ	Symbol	I	λ	Symbol	1
15168,40 15163,08 15161,15 15146,66 15108,04 15102,29 15094,96 15094,96 15094,12 15083,66 15051,60 15050,88 15047,70 15046,42 15040,24 15030,71 15024,99 15005,57 14987,69 14983,51 14973,74 14966,60 14965,4 14961,76 14955,33 14952,07 14947,73 14938,14 14931,70 14924,95 14918,68 14901,33 14892,33 14892,33 14877,62 14868,87 14868,87 14868,87 1486,98 14779,73 14767,48	K I K I CI I N I CI I N I CI I NI CI I NI CI I NI CI I Mg I Mg I Mg I Kr I CI I Kr I CI I C	$\begin{matrix} 16 \\ -145 \\ 755 \\ 269 \\ 266 \\ 75 \\ 480 \\ 25 \\ 70 \\ 30 \\ 42 \\ 35 \\ 259 \\ 95 \\ 80 \\ 25 \\ 259 \\ 95 \\ 80 \\ 25 \\ 259 \\ 95 \\ 80 \\ 25 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 250 \\ 300 \\ 300 \\ 300 \\ 250 \\ 300 \\$	14556,68 14548,55 14542,50 14529,13 14522,81 14508,63 14497,41 14469,33 14454,62 14450,44 14442,24 14466,93 14429,03 14429,03 14429,03 14420,12 14403,25 14403,25 14404,35 14399,65 14384,93 14364,90 14347,82 14341,25 14313,21 14297,53 14292,07 14257,46 14255,80 14249,93 14241,39 14224,54 14214,95 14198,27 14173,84 14156,62 14142,09 14129,80 14122,48 14214,95 14198,27 14173,84 14156,62 14142,09 14129,80 14122,44 14104,27 14093,61 13992,59 13983,32 13978,14 13974,15 13961,45 13956,82 13939,13 13939 13932,97 13924,00 13923,92 13911,08 13910,83 13907,41 13893,10 13885,14 13866,97	CJI NI CI CI INI CI INI CII CII KrI KrI CIII KrI CIII KrI CIII KrI CIII KrI CIII	25 10 179 4 36 16 60 30 29 95 13 1400 12 61 16 80 30 38 4 4 400 9 80 2 73 50 3 7 40 6 2 5 48 115 80 126 14 400 120 140 120 140 120 140 120 140 140 150 160 170 170 180 180 180 180 180 180 180 18
14577 ,51 14576 ,78	Ar I Cl I	$\frac{12}{3}$	13863 ,31 13837 ,58	Cl I Cl I	125

	1	, 	0	1	1
λ	Symbol	ı	λ	Symbol	1
13832,57 13828,79 13827,67 13825,99 13821,72 13802,82 13800,03 13779 13772,48 13765,29 13763,72	Kr I Ar I Cl I Ar I Cl I Cl I Kr I Cs I Cl I C I	50 20 9 30 525 11 3 12 50 1 6	13419,89 13406,57 13397,09 13396,04 13382,46 13377,86 13367,38 13346,76 13337,52	Cl I Ar I K I Cl I Cl I Cl I K I K I Ar I Cl I	90 250 — 95 30 33 — 800 550
13703,72 13758,83 13741,86 13741,86 13718,77 13711,36 13711,23 13710,06 13706,12 13705,41 13697,81	Cs I C I C I Kr I Ar I Si I Kr I Cl I Cl I C I	36 3 1 400 1000 5 100 2 5 1 6	13330,32 13313,39 13309,04 13304,30 13302,37 13296,01 13287,58 13273,05 13243,83 13240,52 13231,37	Ar I Ar I Si I Kr I Ar I Cl I Ar I Cl I Kr I	7 600 5 5 3 310 9 750 350 75 120
13693,85 13686,03 13678,53 13668,60 13658,38 13656,48 13651,63 13649,3 13634,22 13624,18 13622,38	Si I NI Ar I N I Kr I Xe I NI N I Kr I N I	8 14 300 65 360 150 60 10 1700 350 500	13228,49 13214,70 13213,42 13210,56 13208,29 13182,58 13177,38 13176,90 13168,90 13167,75 13165,11 13164,85	Ar I Ar I Cl I Kr I Cl I Cl I Kr I Si I Cl I Ca I	200 150 7 10 20 8 850 11 13 24 24
13622,28 13615,56 13602,57 13602,16 13602,27 13599,18 13588,55 13588,31 13587,73 13586,00 13581,35	Kr I NI Cs I Cl I N I Ar I NI Cs I N I Cl I	800 35 36 11 190 55 155 290 200 6 5	13164,85 13163,89 13150,76 13134,96 13129,66 13123,41 13122,59 13107,98 13095,13 13086,26 13062,73 13061,84	O I O I Al I Ca I Cl I Al I Cl I Cl I Cl I Cl I Cl I Cl I Ca I Ca I Ca I	26 25 14 400 100 15 16 4 49 50 5
13581,33 13578,45 13573,60 13559,66 13557,75 13544,61 13543,75 13534,64 13543,16 13503,99 13502,27	N I Cl I Ar I C I Li I NI Ar I N I Xe I Ar I C I	1200 28 25 12 4 65 15 60 5 850 20	13059,70 13057,82 13040,99 13034,59 13033,41 13028,27 13022,05 13008,47 13001,37 12985,08 12977,98	Cl I Ca I Cl I Cl I Ca I Ar I Kr I Ar I Ca I Kr I	20 125 9 300 5 15 200 20 12 2
13499,24 13498,30 13498,30 13469,98 13465,13 13464,53 13448,12 13429,61 13424,32	Ar I Cl I Cl I Cl I Cl I N I NI N I Cs I	50 160 160 9 2 185 21 670 30	12976,77 12968,44 12956,59 12934,48 12933,33 12912,4 12909,07 12908,57 12897,32	Cl I IIe I Ar I Kr I Ar I Ne I Ca I Cl I N I	20 50 250 1 60 2 200 24 51

	1	1	<u> </u>	1	
λ	Symbol	I	λ	Symbol	I
12885,21 12879,00 12872,10 12869,80 12861,89 12859,16 12845,95 12826,60 12825,08 12823,46 12818,05 12815,69 12814,56 12813,40 12803,05 12802,68 12795,90 12793,31 12790,27 12784,79 12782,39 12771,51 12757,26 12749,83 12747,65 12746,31 12733,59 12702,39 12603,1 12603,32 12661,75 12662,16 12661,75 12639,01 12662,39 12702,39 12661,35 12614,10 12601,48 12598,19 12594,8 12594,45 12594,8 12594,45 12594,8 12594,45 12594,46 12554,44 12594,48 12592,69 12581,69 12581,69 12581,69	Ca I Kr I Cl I Kr I Cl I Kr I Cl I Kr I Ca I Kr I Ca	15 500 39 4 55 13 30 25 100 140 140 140 140 140 140 140	12464,2 12464,02 12461,25 12459,49 12456,05 12451,21 12439,19 12438,40 12432,24 12430,13 12428,81 12419,39 12404,27 12402,88 12395,82 12391,9 12389,03 12384,83 12381,65 12356,82 12343,72 12322,76 12321,48 12298,55 12288,97 12280,55 12270,80 12250,11 12240,81 12250,11 12240,81 12236,26 12235,14 12231,32 12237,67 12231,33 12229,52 12239,33 1210,17 12204,39 12237,67 12231,43 12229,52 12239,33 1210,17 12204,39 12216,97 12142,16 12139,79 12129,97 12142,16 12139,79 12129,97 12142,16 12139,79 12129,97 12142,16 12139,79 12129,97 12142,16 12139,79 12142,16 12139,79 12142,16 12139,79 12142,16 12139,79 12142,16 12139,79 12142,16 12139,79 12147,81 12140,96 12112,20 12103,50 1206,59 12103,50 12084,82 12074,51 12066,38 12031,48	N I O I NE	$\begin{array}{c} 5\\ 21\\ 680\\ 2\\ 100\\ 2\\ 500\\ 195\\ 16\\ 12\\ 6\\ 98\\ 400\\ 6\\ 5\\ 4\\ 20\\ 98\\ 400\\ 6\\ 5\\ 4\\ 12\\ 375\\ 100\\ 150\\ 260\\ 120\\ 27\\ 6\\ 12\\ 20\\ 27\\ 6\\ 12\\ 20\\ 27\\ 60\\ 120\\ 27\\ 60\\ 120\\ 27\\ 60\\ 120\\ 27\\ 60\\ 120\\ 27\\ 60\\ 120\\ 27\\ 60\\ 120\\ 27\\ 60\\ 25\\ 12\\ 100\\ 170\\ 35\\ 40\\ 60\\ 300\\ 25\\ 45\\ 20\\ 30\\ 15\\ 230\\ 15\\ 230\\ 15\\ 230\\ 15\\ 230\\ 15\\ 20\\ 30\\ 15\\ 230\\ 15\\ 20\\ 30\\ 25\\ 45\\ 10\\ 10\\ 20\\ 20\\ 20\\ 20\\ 20\\ 20\\ 20\\ 20\\ 20\\ 2$

λ	Symbol	I	λ	Symbol	I
12026 ,63 12021 ,67	Ar I Cl I	5 172	11658,85 11655,8	C I Kr I	13 1
11998,36 11997,08	N I Kr I	110 480	11669,63 11651,45	C I N I	$24 \over 2$
11996,00	Kr I	25	11647,99	CI	5
11991 ,52 11984 ,99	Si I Ne I	5 10	11638 ,279 11636 ,22	Fe I Cl I	7 4
11984 ,18 11973 ,88	Si I Ti I	10 6	11628,83 11626,40	C I He II	23
11973 ,067 11969 ,48	Fe I He I	8	11625,40	N I	3
11969 ,07 11952 ,57	He I Xe I	220 10	11620,14 11619,29	Mg II C I	$\frac{3}{12}$
11951 ,1 11949 ,72	Xe I Ca II	1	11614 ,18	Ne I Xe l	80 25
11949 ,58	Ti I	1 5	11614,08 11611,6	Kr l	1
11943 ,50 11911 ,44	Ar I Xe I	$\frac{25}{3}$	11601,62 11600,56	Ne I Mg Il	$\frac{25}{3}$
11896,60 11895,75	Ar I C I	$\frac{3}{30}$	11598 ,74	ClI	3 5
11892,91 11892,85	C I Ti I	$\frac{17}{5}$	11593 ,600 11580 ,39	Fe I Ar I	5 8
11884 ,47 11882 ,861	Ar I Fe I	5 7	11579 ,91 11577 ,24	Cl I Cl I	9 11
11879,59	C 1	8	11577,24	Cl I	$\frac{11}{2}$
11874,36 11866,50	Xe I Cl I	1 195	11566 ,114 11557 ,17	N I F I	4 5
11862,99 11857,86	C I Xe I	$egin{array}{cccc} 5 & \ 2 & \end{array}$	11544,65 11539,50	F I Ti I	$egin{array}{c} 5 \ 2 \ 5 \end{array}$
11857,00 11848,73	Xe I C I	30 6	11539,30	Xe I	1
11838 ,99 11828 ,18	Ča II Mg l	$\frac{2}{45}$	11536 ,41 11525 ,11	Ne I Ne I	50 90
11819,43	Kr I	2000	11522,82	Ne I	150
11801,08 11797,24	C I Ti I	7 3	11491 ,22 11488 ,12	Xe I Ar l	15 150
11793 ,04 11792 ,25	Xe I Kr I	40 120	11480 ,22	FI	1
11789,93 11789,11	Ne I Ne I	10 50	11473 ,70 11467 ,57	F I Ar I	$\frac{3}{30}$
11783 ,275 11780 ,54	Fe I Ti I	6 4	11457 ,52 11441 ,83	Kr I Ar I	80 80
11777,54	C I K I	11 17	11439 ,129	Fe I	15
11772 ,83 11769 ,62	ΚI	16	11436,34 $11422,335$	Cl I Fe I	$\begin{array}{c} 1000 \\ 6 \end{array}$
11766,87 11754,76	Ne I C I	$\begin{array}{c} 60 \\ 114 \end{array}$	11415,04 11414,20	Xe I F I	15 1,5
11 753,3 2 11 748,2 2	CI	$\begin{array}{c} 142 \\ 82 \end{array}$	11409,68	Cl I	269
11742,01 11733,26	Xe I Ar I	$\begin{array}{c} 90 \\ 20 \end{array}$	11409 ,24 11403 ,89	Ne I Ti I	100
11720,55	Cl I	180	11403,78 11398,63	Na I	12
11719 ,51 11708 ,22	Ar I Ar I	$\frac{30}{3}$	11393,66	Ar I Ar I	7 50
11692 ,73 11690 ,21	Cl I K I	85 17	11392,66	Cl I	231
11689, 988 11688, 08	Fe I Ne I	8	11390,53 11381,53	Ne I Ti I	1 7
11687 ,61 11678 ,47	Ar I Ar I	5 4	11381,45	Na I	11
11674,14 11652,91	C I C I	7 5	11378,01 11373,93	Cl I	45 5
11668,72	Ar I	100	,80 ,80 11339 ,44	Ne I Kr I	3 1
11659,68	CI	47	11333,60	Ne I	3

λ	Symbol	I	λ	Symbol	1
11331,08 11330,285 11329,56 11328,51 11326,53 11323,169 11316,1 11313,891 11309,56	Cl I C I Ne I Kr I Cl I N I Kr I N I	5 6 1 4 6 3 1 4 5 3	11287,022 11286,914 11286,39 11286,344 11266,198 11262,71 11259,16 11257,74 11256,35 11255,93	O I O I CI I O I N I Kr I Kr I Kr I Mg II	21 24 9 23 3 2 50 80 4 5
11306 ,70 11304 ,47 11303 ,96 11303 ,8 11302 ,376 11302 ,26	Cl I Ne I Ne I Kr I O I Cl I	3 2 5 1 23 4	11254,881 11253,496 11253,190 11248,33 11246,88	Al I Ar II Al I Ar I Ti I	15 1 14 8 8
11298 ,45 11297 ,682 11295 ,104 11294 ,238 11293 ,00	Ne I O I O I N I Ne I	1 22 21 2 2	11243,90 11237,582 11230,91 11227,076 11225,90	Ti I N I Ti I N I He I	10 2 5 3
11292,43 11291,657 11289,83 11289,10 11287,318	Ti I N I Si I Xe I O I	6 5 15 10 21	11214,89 11214,58 11209,67 11197,21 11195,37	Xe I Kr I Ar I Na I Ar I	5 5 1 2 2

λ	Symbol	I	a.	Symbol	I
12026,63 12021,67 11998,36 11997,08 11996,00	Ar I Cl I N I Kr I Kr I	5 172 110 480 25	11658,85 11655,8 11669,63 11651,45 11647,99	C I Kr I C I N I C I	13 1 24 2 5
11991,52 11984,99 11984,18 11973,88 11973,067 11969,48	Si I Ne I Si I Ti I Fe I He I	5 10 10 6 8	11638,279 11636,22 11628,83 11626,40 11625,173	Fe I Cl I C I He II N I	7 4 23 — 3
11969,07 11952,57 11951,1 11949,72 11949,58 11943,50	He I Xe I Xe I Ca II Ti I Ar I	220 10 1 1 5 25	11620,14 11619,29 11614,18 11614,08 11611,6	Mg II C I Ne I Xe I Kr I	3 12 80 25 1
11911,44 11896,60 11895,75 11892,91	Xe I Ar I C I C I	3 3 30 17	11601,62 11600,56 11598,74 11593,600	Ne I Mg II Cl I Fe I	25 3 5 5
11892,85 11884,47 11882,861 11879,59	Ti I Ar I Fe I C I Xe I	5 5 7 8	11580,39 11579,91 11577,24 11573,48	Ar I Cl I Cl I Cl I	8 9 11 2
11874,36 11866,50 11862,99 11857,86 11857,00 11848,73	Cl I C I Xe I Xe I C I	1 195 5 2 30 6	11566, 114 11557, 17 11544, 65 11539, 50 11537, 4	N I F I F I Ti I Xe I	4 5 2 5 1
11838,99 11828,18 11819,43 11801,08 11797,24	Ca II Mg I Kr I C I Ti I	2 45 2000 7 3	11536,41 11525,11 11522,82 11491,22 11488,12	Ne I Ne I Ne I Xe I Ar I	50 90 150 15 150
11793,04 11792,25 11789,93 11789,11 11783,275 11780,54	Xe I Kr I Ne I Ne I Fe I Ti I	40 120 10 50 6 4	11480,22 11473,70 11467,57 11457,52 11441,83	F I F I Ar I Kr I Ar I	1 3 30 80 80
11777,54 11772,83 11769,62 11766,87 11754,76 11753,32	C I K I K I Ne I C I C I	11 17 16 60 114 142	11439,129 11436,34 11422,335 11415,04 11414,20	Fe I Cl I Fe I Xe I F I	15 1000 6 15 1,5
11748,22 11742,01 11733,26 11720,55 11719,51	C I Xe I Ar I Cl I Ar I	82 90 20 180 30	11409,68 11409,24 11403,89 11403,78 11398,63	Cl I Ne I Ti I Na I Ar I	$ \begin{array}{r} 269 \\ 100 \\ 8 \\ 12 \\ 7 \end{array} $
11708,22 11692,73 11690,21 11689,988 11688,08 11687,61	Ar I Cl I K I Fe I Ne I Ar I	3 85 17 8 10 5	11393,66 11392,66 11390,53 11381,53 11381,45	Ar I Cl I Ne I Ti I Na I	50 231 1 7 11
11678,47 11674,14 11652,91 11668,72 11659,68	Ar I C I C I Ar I C I	4 7 5 100 47	11378,01 11373,93 11366,80 11339,44 11333,60	Cl I Cl I Ne I Kr I Ne I	45 5 3 1 3

λ	Symbol	I	λ	Symbol	1
11190 ,19 11187 ,588 11187 ,13 11180 ,114 11177 ,59 11175 ,5 11173 ,266 11162 ,67 11160 ,29 11151 ,25 11143 ,09 11141 ,09 11138 ,55 11134 ,62 11130 ,81 11130 ,03 11127 ,20 11122 ,97 11120 ,37 11119 ,809 11118 ,75 11118 ,2 11106 ,44 11096 ,70	Na I Si I Kr I N I Ne I Xe I Ar II Xe I Ne I Cl I Ne I Xe I Ne I Ar I Ar I Ar I Cl I The I Ar I The I T	1 16 40 1 300 1 2 10 10 6 300 50 4 4 20 8 12 100 300 5 10 20 10 6 6 10 10 6	10979,308 10977,30 10976,06 10974,33 10973,80 10965,450 10964,00 10957,304 10954,260 10953,320 10951 10950,74 10947,90 10945,43 10940,37 10938,09 10935,11 10934,12 10930 10924,81 10923,438 10919,07 10916,98 10916,67 10914,23 10912,92	Symbol Si I Ar I LiI Ar II Mg I Ar II Mg I Ar II Mg I Ar II Cl I F I H D T Cs I F I Ar II LiI He I Ar II Mg II	80 1 0 1 2 28 2 27 2 25 10 120 20 5 4 28 28 28 27 25 10 120 20 5 4 28 28 29 4 20 5 4 20 7 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8
11095,79 11093,76 11093,04 11085,25 11082,93 11078,87 11072,10 11068,44 11067,929 11063,58 11057,58 11055,22 11049,80 11044,06 11043,13 11032,103 11032,09	Ti I Cl I Cl I Xe I Cl I Ar I Cl I Ar II Ar II Cl I Ne I Ti I Cl I Ne I He I Ar I Mg I Mg I Li I	5 6 250 206 200 3 1 2 2 2 2 3 2 20 8 15 2 14 15 15	10912,92 10902,16 10896,10 10895,9 10895,32 10892,37 10891,733 10886,35 10885,9 10885,336 10885,336 10884,60 10883,3 10883,28 10882,802 10880,96 10879,78 10879,19	He I He I Ti I Ar I Xe I Ar I A1 I Ne I Ar I Si I R I Cu I F I Si I Ar I Ca I R I A1 I	60 1 8 1 200 30 11 8 5 2 30 2 1 2,5 30 150 4 1 100 10
11028,60 11022,67 11020,93 11019,87 11017,9648 11014,52 11013,07 10996,56 10990,70 10986,71 10985 10984,527 10982,382 10982,061	Ar I K I Ne I K I Si I Cl I He I Ti I Cl I Cs I Si I Ar II	1 16 10 17 80 3 8 3 13 1,5 20 2 30	10872,975 10869,698 10869,5408 10869,37 10868,79 10867,87 10867,343 10863,72 10863,60 10862,31 10861,51 10861,04 10845,43 10844,54	Ar II Si I Ca I Si I Ar II Ar II Ar II Ca I Fe I Fa I Ar I Ar I Ar I Ar I	10 2 130 3 30 1 3 2 5 20 3 25 2 200

λ	Symbol	I	λ	Symbol	I
10843,854 10841,55 10838,77 10838,34 10838,30	Si I Cl I Ca I Xe I Ne I	60 100 10 1000 3	10758,28 10757,888 10756,90 10753,985	Ne I N I Ti I C I	2 7 5 2
10837,39 10834,87 10833,66 10833,12	Ar I Na I Ti I Ca I	1 8 3 4	10753,530 10749,3837 10749,29 10746,44	O I Si I Na I Na I	17 60 9 10
10831 ,88 10831 ,68 10830 ,337 10830 ,33	Ar I Cl I He I Ne I	$\begin{array}{c} 1 \\ 9 \\ 25000 \\ 4 \end{array}$	10741 ,77 10733 ,87 10732 ,89 10732 ,10 10731 ,41	Ti I Ar I Ti I Ar I Ti I	7 50 8 2 6
10830 ,248 10829 ,452 10829 ,088 10827 ,091	He I Ar II He I Si I	15000 3 5000 140	10730,510 10729,533 10729,43 10727,4076	N I C I Kr I Si I	4 6 2 30
10824,00 10822,74 10822,20 10820,31 10820,18	Ar I Ar I Cl I Ti I Ar I	1 1 3 5 6	10726,33 10722,22 10720,530 10717,954	Ti I Ar I Ar II N I	18 6 1 6
10820,16 10819,95 10817,858 10817,35 10814,83	Ar I Ne I Ar II Ti I Ne I	6 5 1 5	10717 ,84 10713 ,550 10712 ,77 10707 ,333	Cl I N I Ar I C I	2 8 40 6
10812,901 10811,085 10812,16 10808,22	Ar II Mg I Ar I Ne I	12 35 1 7	10706 ,78 10700 ,98 10699 ,33 10694 ,2510	Xe I Ar I Kr I Si I	150 80 20 30
10807,04 10806,43 10798,12 10796,06 10795,91	Ar I Ne I Ne I Si I Ar I	5 5 150 7 2	10693,167 10691,250 10690,94 10690,48	N I C I Cl I Ne I	3 10 14 6
10793,91 10793,65 10789,37 10786,8560 10786,770	Ti I Ne I Si I Al I	3 2 80 4	10689,719 10689,52 10685,345 10683,40	Si I Ti I C I Ar I	25 15 6 50
10785,13 10785,12 10784,5597 10782,045 10781,34	Ar II Cl I Si I Al I Ti I	1 7 30 9 3	10683,082 10683,050 10681,99 10681,78 10677,04	C I Ar II Cl I Ar I Ti I	8 12 7 200 10
10780,57 10774,993 10774,92 10773,35 10771,7	Ne I N I Ti I Ar I Cu I	6 3 12 30 2	10675,940 10675,725 10673,80 10673,55 10667,65	O I O I Ne I Ar I He I	16 17 2 500 15
10770,35 10769,43 10768,364 10766,15 10764,378	Ar I F I Al I Ne I Ar II	15 4 8 10 8	10661,61 10660,99 10660,9748 10659,5	Ti I Ar II Si I Kr II	20 2 120 1
10764,09 10760,34 10759,13 10758,86	Ne I Ne I Ar I Xe I	12 1 60 100	10653,034 10647,63 10643,981 10639,86 10639,34	N I Kr I N I Ar II Kr II	8 1 6 1 6
(1 9 0					

λ	Symbol	I	λ	Symbol	ı
10638,121	Ar II	8	10500,266	NI	6
10634 ,25 10627 ,6467	Ar I Si I	$\begin{array}{c} 5 \\ 20 \end{array}$	10500 ,212 10496 ,14	Ar II Ti I	6 30
10626 ,70 10623 ,38	Kr I Ar I	$rac{8}{2}$	10495 ,941	Ar II	2
10623 ,177	ΝΙ	5	10490,21 10487,11	F I K I	1 8
10620,63 $10620,37$	Ne I Cl I	$\begin{array}{c} 40 \\ 7 \end{array}$	10486,29	Kr I	2
458, 10619	Ar II	7	10484 ,83 10482 ,15	Xe I K I	8 5
10615 ,7 10614 ,01	Ar I Ar II	1 1	10479,63 10478,10	K I Ar I	$\begin{array}{c} 9 \\ 200 \end{array}$
10608,43	Kr I	20	10472,38	ClI	3
10607,78 10603,431	Ti I Si I	$\begin{array}{c} 10 \\ 120 \end{array}$	10470,051	Ar I	500
10600,53	ClI	18	10469 ,59 10467 ,86	Fe I Cl I	$\frac{20}{7}$
10596,958 10593,01	N I Kr I	$\begin{matrix} 6 \\ 100 \end{matrix}$	10467 ,173 10460 ,07	Ar II Ti I	20 10
10592,28	$\mathbf{F} \mathbf{I}$	2	10458,56	Kr I	6
10591 ,905 10591 ,23	N I Ar I	$rac{5}{2}$	10447 ,771 10442 ,57	Ar II Ar II	$rac{2}{1}$
10588,71	FΙ	5	10440,511	Ar II	6
10585 ,1412 10584 ,66	Si I Ti I	$\begin{array}{c} 120 \\ 25 \end{array}$	10432 ,53	Ne I	3
10580 ,83	Ar II Ar I	2 4	10431 ,92 10431 ,84	F I Kr II	$\frac{1}{2}$
10576 ,18 10575 ,50	Kr I	2	10428,40	Kr II Cl I	10 44
10572,28	Na I	3	10427 ,54 10426 ,29	FI	6
00, 10566 10565, 97	Na I Ti I	1 5	10420,52	Xe I	. 1
10563,339	NI	5	10420,26 10420,05	Cl I Cl I	105 105
10562,84 10562,43	Kr II Ne I	$\frac{4}{200}$	10417,29	F I Ar II	$\begin{array}{c} 7 \\ 2 \end{array}$
10560 ,89 10555 ,90	Cl I Ar II	4 1	10410,53		
10554,96	Cl I	8	10401 ,510 10396 ,85	Ar II Ti I	$\begin{array}{c} 1 \\ 25 \end{array}$
10553,02	Ti I	8 3	10395 ,811 10392 ,604	Fe I Ar II	8 5
10551 ,81 10549 ,76	Ti I Xe I	20	10392,51	Cl I	331
10549 ,635	NI	8	10392,23	Mg II	$\begin{array}{c} 6 \\ 5 \end{array}$
10546 ,76 10541 ,552	N II Ar II	4 5	10391 ,76 10389 ,28	Mg II Kr II	8
10541,226 10539,554	C I N I	$\frac{4}{10}$	10387,97 10383,900	Cl I Ar II	34 1
10539 ,18	Cl I	44	10380,84	FΙ	7
10535,52	Ar II	2	10374,44	Kr I	10 30
10533 ,775 10532 ,21	N I Fe I	5 10	10371 ,269 10361 ,15	Si I Kr II	100
10529 ,32	Ar I Xe I	$\begin{array}{c} 50 \\ 40 \end{array}$	10360,37	Kr I	100
10527 ,84 10527 ,34	Ar I	2	10357,6 10350,02	Ar I Cl I	$\frac{1}{2}$
10520,574	N I Ar II	8 9	10343,85	Ca I	500
10519,510 10515,15	Xe I	10	10332 ,95 10332 ,76	F I Ar I	2 ,5 60
40513,403 10510,60	N I Li I	$\frac{7}{3}$	10329,77	Cl I	5
10507,91	Xe I	6 8	10325,34 10322,88	Ar II Kr I	$\frac{1}{2}$
10506 ,998 10506 ,72	N I Cl I	33	10320,08	Cl I	205
10506,47	Ar I	100	10319,62	Ar I	2

		 	<u> </u>		
λ	Symbol	1	λ	Symbol	1
10312,16 10311,54 10311,23 10309,15 10305,616	Cl I He I He I Ar I Ar II	44 7 50 20 1	10157,07 10147,68 10147,274 10147,09 10146,78	Kr II Kr I N I Ti I Cu I	2 10 8 4 10
10305,50 10299,077 10296,93 10295,40 10293,01	Cl I Ar II Kr I Ne I F I	22 5 80 80 3,5	10145,601 10145,48 10138,50 10138,408 10128,285	Fe I Ti I He I Ar II N I	80 8 5 1 7
10288,942 10287,96 10285,45 10280,07 10273,689	Si I F I F I Cl I Ar II	10 1,5 15 4 5	10127,74 10126,27 10125,47 10124,5 10123,871	Kr II N II Xe I Cu I CI	4 5 20 5 6
10273,6 10270,75 10268,320 10266,79 10257,30	Kr I F I Ar II Ar I Ti I	2 4 2 1 3	10123 ,61 10123 ,6025 10123 ,415 10120 ,96 10120 ,90 10119 ,8	He II Cs I Cs I Kr I Ti I Xe I	1200 200 30 10 1
10254,04 10251,07 10245,70 10241,98 10233,06	Ar I Xe I Ne I F I He I	10 20 7 4 2	10119 ,20 10118 ,49 10114 ,644 10112 ,484 10111 ,595	Ti I N II N I N I Ar II	3 4 13 12 8
10230 ,845 10226 ,82 10224 ,6 10222 ,50 10221 ,46	Ar II F I Ne I F I Kr II	4 3 2 2 1000	10110 ,660 10108 ,895 10107 ,34 10107 ,19 10105 ,147	Ar II N I Xe I Al II N I	3 11 80 4 10
10221,12 10220,980 10220,8 10216,351 10210,73	Cl I Ar II Xe II Fe I Ne I	10 1 3 100 2	10103,147 10104,82 10095,7 10094,32 10093,016	Ar I Xe II Ar I Ar II	4 1 8 1
10209,57 10208,7 10206,9 10206,9 10203,917	F I Ar I Ar I Xe II Ar II	4 1 1 1 5	10092 ,16 10091 ,64 10091 ,53 10087 ,13 10084 ,79	Mg II Cl I Ne I F I Xe I	$ \begin{array}{c} 14 \\ 40 \\ 3 \end{array} $ $ \begin{array}{c} 6 \\ 20 \end{array} $
10199,98 10189,26 10188,36 10186,15 10179,92	N I Ti I Xe I F I Ti I	2 3 10 5 3	10080 ,47 10077 ,66 10077 ,32 10076 ,29	Cu II Kr I Al II Al II	10 10 1
10179 ,2 10177 ,41 10172 ,00 10171 ,2	Cu I Kr II Cu I Ar I	1 3 2 1	10074 ,17 10072 ,04 10070 ,12 10069 ,04 10066 ,47	F I He I N II Ar I Ti I	1 3 6 50 8
10170,60 10167,61 10167,252 10166,91 10166,79	Ti I Kr II O I Cu II N I	3 10 10 15 3	10065,96 10065,15 10065,08 10064,25	Kr I N II Fe I F I	10 7 60 4
10164,849 10163,50 10163,45 10162,88	N I F I Ar I Cu II	$egin{array}{c} 7 \\ 3 \\ 30 \\ 1 \end{array}$	$\begin{array}{c} 10060,96 \\ 10059,87 \\ 10057,96 \\ 10057,69 \\ 10055,02 \end{array}$	Xe I Ti I Xe I Ti I Cu II	10 12 5 25 30

λ	Symbol	I	λ	Symbol	
10054,86 10054,259 10054,2 10052,10	Kr I N I Xe II Ar I	2 4 1 150	9972 ,313 9970 ,92 9969 ,34 9967 ,045	Ar II F I N II Ar II	1 4 7 12
10051 ,12 10050 ,11 10049 ,88 10049 ,38	Cu II Ti I Cu II H	3 5 1 6	9966 ,67 9966 ,58 9965 ,736	Kr II Xe I N I	5 10 3
10048 ,78 10046 ,64 10045 ,73	Ti I D T	12 6 6	9965 ,41 9963 ,55 9962 ,314 9961 ,86	Ar II Ne I Ar II N II	1 6 1 6
10042 ,27 10039 ,75 10038 ,9 10038 ,65	Kr II Ar I Ne I Kr I	20 2 2 3	9961 ,281 9960 ,46 9960 ,07 9955,09	Na I Cu II Cu II Li I	7 15 10 2
10038,19 10038,03 10037,1 10036,32 10035,45	Cu II F I Ne I Cu II N II	15 4 2 5 7	9954,75 9954,74 9954,141 9952,809 9951,88 9951,087	Kr II Ca II K I Ar II Ar I Ar II	$20 \\ 8 \\ 5 \\ 5 \\ 20 \\ 4$
10034,45 10032,81 10031,16 10029,70	Ti I Li I He I Ar I	15 2 10 40	9949 ,668 9949 ,151 9948 ,98	K I K I Ar II Ti I	6 7 8
10027,73 10026,93 10024,3595 10023,72 10023,27	He I Cu II Cs I Xe I N II	30 1 1000 50 8	9947,94 9947,066 9944,9 9944,1	Ne I N I Ne I Ne I	15 4 2 7
10023 ,05 10022 ,278 10017 ,97 10017 ,822	Cu II Ar II Kr II N I	30 4 20 5	9941 ,33 9939 ,05 9938 ,85 9937 ,80 9936 ,83	Ti I Cu II Ne I Ar I Ne I	8 20 15 1
10011 ,72 10008 ,55 10007 ,61 10007 ,31	Ti I Ne I Ar I Ne I	15 4 3 30	9935 ,046 9931 ,680 9931 ,474	Ar II Ar II N I Ca II	1 1 5 9
10006,68 10005,54 10003,055 10003,02	Cu II Ne I N I Ti I	10 20 5 25	9931 ,39 9928 ,830 9927 ,35 9926 ,10	Ar II Ti I Cu II	1 20 10
10002,25 9997,94 9997,750 9994,94	Cl I Ti I N I Ar I	4 15 4 1	9925 ,67 9923 ,192 9918 ,52	Cu II Xe I Ne I	$\begin{array}{c} 20\\3000\\4\end{array}$
9994,32 9993,874 9993,209 9990,9	Cu II Ar II Mg I Xe II	1 4 18 2	9918,05 9917,60 9916,52 9916,37 9916,144	Cu II Kr I Cu II Kr I Ar II	15 3 30 4 4
9989 ,3 9989 ,02 9988 ,39	Kr I Ar II Ar II	1 1	9915 ,20 9915 ,13 9914 ,246	Cu II Ne I Ar II	$\begin{array}{c} 1 \\ 20 \\ 2 \\ \end{array}$
9986 ,475 9983 ,4 9983 ,20 9981 ,16	Mg I Xe II Mg I Ti I	17 1 15 5	9909,712 9909,220 9908,9	Ar II N I Xe II	2 2 2 5
9980 ,424 9977 ,825 9974 ,2	N I Ar II Ne I	3 3 2	9906,394 9905,880 9905,65 9905,54	Ar II Ar II F I N I	5 1,5 0
					635

λ	Symbol	I	λ	Symbol	I
9905, 44 9904, 29 9902, 65 9902, 31 9900, 58 9899, 06 9897, 30 9897, 08 9895, 8 9894, 44 9893, 04 9892, 97 9892, 18 9891, 72 9891, 72 9891, 09 9889, 063 9889, 082 9887, 39 9887, 36 9884, 09 9883, 58 9883, 369 9881, 57 9879, 41 9875, 95 9875, 90 9872, 159 9868, 21 9868, 20 9865, 56 9865, 41 9868, 20 9865, 56 9865, 41 9864, 26 9863, 332 9862, 95 9861, 793 9861, 41 9858, 87 9856, 24 9854, 74 9854, 065 9851, 40 9858, 87 9856, 24 9854, 74 9854, 065 9851, 40 9858, 87 9856, 24 9854, 74 9854, 065 9851, 40 9858, 87 9856, 24 9854, 74 9854, 065 9851, 40 9858, 87 9856, 24 9857, 74 9854, 065 9851, 40 9858, 87 9856, 24 9857, 74 9854, 065 9851, 40 9858, 33	Cu II Ar II F I Ne I Ne I Ne I Ne I Kr I Xe II Cu II Cu II Kr II O I Si I N II Ca II F I N I Cu II Ti I Cu II N I Cu II Ti I Cu II Xe II N I Cu II Xe II N I Cu II Xe II N I Cu II Xr I Cu II Xr I Cu II Kr I Cu II	2 1 12 30 40 2 3 2 1 5 5 10 6 13 10 7 11 40 6 10 10 8 3 15 3 5 0 2 6 6 40 9 4 3 5 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	9825,847 9825,843 9824,642 9823,42 9823,39 9822,754 9822,11 9820,90 9819,18 9815,74 9815,22 9814,424 9814,026 9813,45 9813,35 9810,28 9810,27 9810,018 9808,46 9806,90 9803,697 9803,14 9802,019 9800,92 9800,6 9800,335 9799,906 9799,699 9798,565 9799,906 9799,699 9794,80 9794,80 9794,80 9794,80 9794,80 9794,80 9794,80 9794,80 9794,80 9776,904 9776,904 9776,904 9777,6 9776,904 9777,6 9776,904 9774,79 9773,575 9771,833 9770,28 9770,28 9770,1	O I Ar II Ne I Kr II Ne I Kr II N I F I Xe II Ar II Cl I Ar II Cu II Xe II Kr I N I Cl I Cl I Ar II Kr II Kr II Fe I Si III Xe I N I Kr II Fe I Si III Xe I N I Kr II	13 1 2 5 100 7 15 2 1 3 4 5 20 2 2 2 5 5 5 4 500 2 2 2 2 2 2 2 2 2 2 2 2 2
9832 ,15 9830 ,90 9829 ,856 9829 ,06	Ti I Cu II Ar II Cu II	25 5 3 3	9768 ,69 9768 ,22 9763 ,913	Kr I Ti I Fe I	2 5 1 5
9828,06 9826,58 9826,002	Cu II Kr II O I	5 100 12	9763 ,450 9761 ,847 9760 ,65 9760 ,57	Fe I Ar II O I Ne	15 1 5 2
626					

λ	Symbol	I	λ	Symbol	I
9758 ,644 9756 ,157 9753 ,57 9751 ,759 9750 ,145	Ar II Ar II F I Kr I Ar II	4 3 1,5 2000 3	9701 ,515 9701 ,12 9700 ,99 9699 ,40 9698 ,68	Ar II C III Xe I F I Xe II	1 2 20 7 50
9746 ,86 9744 ,8 9744 ,33 9743 ,60 9743 ,460	Ti I Xe II Cl I Ti I Ar II	15 1 30 50 2	9696 ,77 9694 ,01 9694 ,0 9693 ,27 9689 ,39	N II N I N II Kr II Si I	1 1 1 2 10
9743 ,11 9741 ,49 9741 ,43 9741 ,3 9739 ,770	Kr I O I N II Ne I Ar II	50 4 4 1 2	9688,86 9688,71 9688,60 9687,83 9686,37	Ti I Cu II Ca I Kr I Li I	30 10 15 10 2
9739,6 9739,4 9738,624 9737,77 9737,75	Cu I Kr II Fe I Ti I N II	4 2 200 5 4	9685,32 9682,26 9682,19 9678,98 9678,812 9677,80	Xe I Kr I He I Ti I Ar II Ar I	150 2 1 3 2 8
9736,70 9735,94 9734,554 9734,34 9734,0	F I Cù II Ar II F I Xe II	9 15 1 25 3	9677,41 9676,287 9576,25 9675,55	O I Ar II Ca I Ti I	1 3 5 90
9732 ,28 9728 ,36 9728 ,2 9727 ,51 9724 ,8	Cu II Ti I Ne I Kr I Ne I	3 60 1 2 1	9673,39 9672,90 9669,54 9669,03 9666,86	Ar I Kr II Cl I Kr I Ar I	6 6 5 1 50
9722 ,78 9722 ,36 9720 ,6 9720 ,57 9718 ,96	Kr I N II Kr II F I Ti I	1 1 3 1 25	9665,424 9664,29 9663,58 9663,34 9663,19	Ne I Ca I Ca I Kr II Ti I	1000 3 2 200 3
9718 ,66 9718 ,16 9717 ,73 9717 ,16	N II Xe I C III Kr II	$ \begin{array}{c} 1 \\ 100 \\ 2 \\ 10 \end{array} $	9662,04 9661,90 9661,42 9658,44	F I Cl I Ti I C I	12 20 10
9717,00 9715,51 9715,11 9714,85 9713,117	Ti I Ti I C III Kr I Ar II	10 3 5 15 2	9657,7841 9655,974 9653,143 9647,40	Ar I Ar II Fe I Ti I	1500 3 20 50
9711 ,779 9711 ,60 9710 ,03 9706 ,44	Ar II Kr II Xe I C III	1 200 2 2	9643,312 9642,2 9641,6 9641,190 9638,28	Ar II Ne I Xe II Ar II Ti I	$\begin{array}{c} 1 \\ 1 \\ 4 \\ 2 \\ 100 \end{array}$
9706 ,2 9705 ,64 9705 ,39 9704 ,22	Xe II Ti I C III Kr I	2 80 3 50	9632,435 9632,37 9631,888 9630,95	Mg II Cl I Mg II Xe II	11 20 12 3 30
9702,86 9702,60 9702,40 9702,35	Ti I Ile I Ne I Cl I	3 15 3 40	9626 ,562 9625 ,64 9623 ,235 9622 ,5	Fe I He I Ar II Kr II	30 3 2 3 4
9701 ,961 9701 ,81	Ar II Ca I	$\frac{1}{20}$	9622,068 9620,80	Ar II C I	9

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λ	Symbol	I	λ	Symbol	I
9619,61 9619,575 9615,74 9615,63 9613,80 9612,508 9609,06 9606,77 9605,80 9605,80 9604,50 9603,42 9603,03 9601,933 9599,53 9599,325 9597,829 9595,704 9595,09 9594,24 9593,67 9592,20 9592,19 9591,35 9590,15 9588,77 9588,77 9588,77 9588,77 9588,77 9588,77 9588,77 9588,77 9588,77 9588,77 9584,77 9584,77 9584,77 9581,42 9577,70 9577,52	Kr II Ar II Xe II Kr I Kr II Kr II Cl I Ti I Kr II Xe I Xe II He I C I Ar II Ti I Ar II K I Ar II K I Ar II K I Ar II K I Ar II Cl I Ar II Cl I Ar II Ti I Cl I Xe II Ti I T	400 3 4 3 100 2 35 3 500 3 7 6 50 2 14 15 4 100 1 75 5 5 3 4 100 3 4 100 3 4 100 3 4 100 3 4 100 3 4 100 3 4 100 100 100 100 100 100 100	9543,376 9542,509 9540,89 9540,664 9535,640 9534,167 9532,3 9530,73 9530,3 9529,27 9526,39 9526,17 9522,01 9520,23 9516,87 9516,60 9513,379 9512,43 9511,80 9511,55 9510,81 9508,440 9508,49 9508,49 9508,49 9508,49 9508,49 9506,59 9506,04 9505,78 9505,78	D T Kr I Ar II Ar II Ne I Kr I Li I Cu I He I Ar II He I O I Kr II Cl I He I Xe I Ti I Ti I Ti I Ti I Ti I Xe I O I Kr II Ti I Ti I Ti I Xe I Ne I Ti I Xe I Ne I Ti I Ne	5 5 30 5 3 500 1 1 5 4 4 15 3 20 200 2 8 10 12 3 20 5 3 20 20 5 3 20 20 5 10 10 10 10 10 10 10 10 10 10
9576,43 9574,80 9573,99 9571,30 9570,65 9570,08 9569,960	Cl I F I Ne I Cl I Si I Ti I Fe I	8 3 2 5 8 4 40	9500,60 9499,39 9498,04 9497,9 9497,07 9492,76 9487,76	Kr II O I O I Ne Xe I O I Xe I	100 0 8 2 40 1 4
9564,32 9561,60 9561,26 9555,2 9554,96 9553,631 9552,99 9552,89	Kr II Ar I Kr II Ar I Cl I Ar II FI He I	5 5 2 4 4 5 0,7	9487,49 9486,89 9486,680 9486,02 9483,00 9481,93 9480,871	O I Cl I Ne I Ar I Cl II Cl I Ar II	6 25 500 3 2 3
9552,85 9552,30 9549,4 9547,73 9547,40	Kr II F I Kr II Ar I Ne I Ti I	10 0,7 2 300 50	9480,73 9478,39 9476,4 9475,239 9475,23 9475,06 9473,36	N II Ar I Kr II Ar II Xe II Kr II Cu II	1 50 5 4 3 100
9545,974 9543,64	H Kr II	5	9472,4 9470,93	Cu I Cu I Kr II	$\begin{array}{c} 1 \\ 2 \\ 200 \end{array}$

λ	Symbol	I	λ	Symbol	I
9467 ,81 9465 ,938 9464 ,3 9464 ,23 9463 ,71	Ne I Na I Xe II N I Cu II	2 6 10 1 3	9400 ,59 9399 ,24 9393 ,81 9393 ,8	Xe II O I Cl I Ne	15 1 50 2
9463 ,61 9461 ,67 9460 ,676 9459 ,21 9459 ,09	He I Kr II N I Ne I Ar I	50 3 10 300 100	9392 ,789 9389 ,47 9388 ,08 9387 ,33 9386 ,805 9386 ,75	N I F I Kr II Si I N I F I	15 0,8 50 10 14 2,5
9454,0 9453,50 9453,22 9452,08 9452,06	Ne I N II Ti I Ne I Cl I	1 1 3 10 75	9384,96 9377,63 9377,2 9376,71 9374,76	F I Ar I Ne I Li I Xe I	40 5 5 1 100
9451,59 9450,88 9447,6 9446,57 9445,34	Cu II Kr I Xe II Ar I Xe I	2 20 1 2 80	9374 ,163 9374 ,02 9373 ,28 9372 ,904 9368 ,02 9363 ,6	Ar II Xe I Ne I Fe I Ne Kr II	$\begin{array}{c} 3 \\ 10 \\ 200 \\ 6 \\ 2 \\ 1 \end{array}$
9445,26 9443,8 9442,82 9442,68 9441,46	Ne I Ne I N II Xe I Xe I	3 2 3 20 20	9362,50 9362,03 9361,95 9360,466 9358,37	Ar I Kr I Kr II Ar II C III	4 100 300 1 1
9440,02 9439,40 9438,783 9437,21 9436,22	Kr II N II Mg I Kr II Ar II F I	100 1 20 20 1 200	9354,218 9353,3 9352,23 9351,590 9350,44	Ar I Ne I Kr I K I Fe I	200 3 100 6 10
9433 ,67 9432 ,94 9432 ,764 9431 ,77 9431 ,20	Ne I Mg I Ti I N II	40 49 3 1	9349,248 9349,08 9347,235 9345,11 9344,93	K I Kr II K I Kr II He II	3 100 7 100
9430 ,25 9429 ,814 9425 ,38 9421 ,78 9420 ,484	Kr II Mg·I Ne I Si I Ar II Cl I	17 500 15 4	9344,793 9340,59 9340,544 9340,5	Ar II Ar I Mg II Ne I Kr I	2 3 10 2 1
9419,82 9418,582 9414,964 9414,94 9414,14	Ar II Mg I Kr II Fe I	$\begin{array}{c} 1 \\ 25 \\ 100 \\ 20 \end{array}$	9337,9 9337,73 9334,80 9334,08 9333,32	Kr II Ar I Xe I Ar I	2 8 3 1
9414,07 9413,506 9413,32 9412,72 9412,32	Cl I Si I Kr II Si II Ne I	$\begin{array}{c} 2\\100\\3\\100\\4 \end{array}$	9332 ,04 9331 ,979 9331 ,67 9331 ,546 9331 ,05	Cu II Al II Xe II Al II Ar II	5 2 4 3 1
9412,01 9410,75 9408,66 9407,57 9405,73	Xe I Ne I Ar I Xe II C I	60 6 3 1 16	9330,66 9328,08 9327,545 9326,66 9326,52	Kr II Ar I Mg II Ne Ne I	5 2 10 2 600
9405 ,75 9402 ,82 9402 ,69	Ne I Kr II Ar I	8 200 20	9326 ,19 9326 ,03 9325 ,84	Kr II Kr I N II	4 10 0

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λ	Symbol	1	λ	Symbol	I
9323,899 9320,99	Si III Kr II	3 200	9257 ,62 9255 ,778	Ti I Mg I	7 30
9318 ,22 9317 ,84 9314 ,34	Si I Kr II F I	10 30 60	9253 ,98 9253 ,67 9252 ,628	N II Si I Ar II	1 15 2
9313 ,98 9313 ,51 9312 ,48	Ne I Ar II Ti I	300 1 4	9249 ,41 9246 ,499	Al II Mg I	1 12
9310 ,58 9306 ,64	Ne I Xe I	150 40	9246 ,14 9245 ,45 9245 ,18	Ti I Kr II Xe I	10 20 3
9305,87 9305,76 9304,77 9301,95	Ar II Kr II Xe II Xe I	1 1 1 30	9244 ,57 9244 ,266	F I Mg II	15 13
9300 ,85 9299 ,40	Ne I Kr I	600 1	9244,15 9243,54 9243,00	Xe II Kr I Kr I	$\begin{smallmatrix}2\\30\\1\end{smallmatrix}$
9298 ,7 9296 ,1 9293 ,82	Xe II Kr II Kr II	2 60 500	9242 ,17 9242 ,02	Ar I N II	1 2
9291 ,58 9290 ,747 9290 ,649	Ar I Al II Al II	100 5 6	9238 ,59 9238 ,48 9235 ,38	Xe II Kr II F I	2 500 50
9289 ,95 9288 ,82 9288 ,550	Kr II Cl I Al II	$\begin{array}{c} 20 \\ 60 \\ 2 \end{array}$	9234 ,16 9233 ,18	Kr I Kr II	1 50
9288 ,4 9288 ,145 9287 ,87	Xe II Al II Kr I	5 3 1	9232 ,85 9229 ,40 9229 ,017	FI FI H	$\begin{smallmatrix}6\\2,5\\4\end{smallmatrix}$
9286 ,794 9286 ,578	Al II Al II	2 1	9226,86 9226,67 9226,50	Cu II Ne I D	$\begin{matrix}1\\200\\4\end{matrix}$
9285,04 9281,06 9279,9	Ti I N II Kr I	5 3 2	9226,39 9225,667 9224,83	Xe II T Kr I	7 4 1
9279 ,712 9275 ,53 9273 ,02	Ar II Ne I Kr I	4 100 8	9224 ,4955 9223 ,05	Ar I F I	1000 6
9271 ,99 9270 ,96 9269 ,38	Kr II Kr I Kr II	50 10 2	9222 ,39 9221 ,88 9221 ,59	Xe I Ne I Ne I	5 150 200
9266 ,61 9266 ,17 9266 ,006	N II Kr II O I	$egin{array}{c} 1 \\ 2 \\ 24 \end{array}$	9221,08 9220,05 9219,001	Ar I Ne I Ar II	5 400 2
9265 ,938 9265 ,67 9263 ,54	O I Xe II Cu I	21 10 3	9218,248 9217,32 9217,10 9216,51	Mg II Li I N II Xe I	14 2 2 1
9262 ,93 9262 ,774	Kr II O I	$\frac{2}{23}$	9214 , 61 9212,9	Li I Ne I	1 2 3
9262 ,69 9262 ,69 9262 ,671	F I Kr I O I	8 1 22	9212 ,39 9211 ,38 9210 ,39 9210 ,337	Cl I Xe I Ar II He I	25 1 10
9262 ,584 9260 ,935 9260 ,845	I O I O I O	19 20 21	9210,033 9208,5382 9208,35	Fe I Cs I Si I	6 200 15
9260 ,806 9259 ,60	O I Xe II	20	9208,001 9207,59	N I N I	8 3
9259 ,05 9258 ,78 9258 ,31	Fe I Ar II Fe I	15 1 20	9207 ,27 9205 ,40 9203 ,20	Kr II Cu II Xe I	8 20 30
640					

λ	Symbol	I	λ	Symbol	I
9201,76 9198,61 9197,49 9197,18 9196,7 9194,637 9193,8 9192,605 9191,8 9191,67 9191,65 9191,17 9188,69 9187,84 9182,83 9181,23 9180,17 9178,68 9175,42 9174,52 9173,267 9172,3217 9172,14 9170,86 9169,76 9168,917 9167,53 9167,52 9165,938 9164,04 9163,261 9162,33 9159,030 9158,38 9157,82 9156,02 9153,878 9152,12 9151,78 9150,82 9141,8 9139,950 9136,6	Ne I Ar I Cl I Xe I Kr II Ar I Xe II Ar II Ne I Cl I F I Ar II Kr II N I C I Kr II Ar II F I Ar II Kr II He I Si III Cs I Al I Ar II Xe I Ar II Xe I Ar II Xe I Na I Kr II Xe I Ar II	600 50 25 2 1 150 2 3 60 10 1 2 3 9 4 10 6 350 40 2 2 1000 4 5 3 1 8 100 6 350 2 2 2 2 2 2 2 2 2 2 2 2 2	9121,00 9118,892 9115,00 9112,24 9111,69 9111,3 9107,87 9106,573 9106,24 9103,53 9102,3 9102,3 9102,3 9102,3 9102,3 9102,3 9102,3 9102,3 9102,3 9099,72 9098,58 9097,49 9096,49 9096,49 9096,49 9096,49 9096,3 9094,8 9094,8 9095,099 9094,8 9090,70 9089,90 9089,45 9089,45 9089,45 9089,45 9089,45 9088,51 9088,324 9087,18 9079,707 9079,599 9078,28 9075,42 9073,34 9073,15 9073,04 9069,66 9069,61 9069,66 9069,61 9068,023 9068,023	N II Fe I Kr II Xe I C I Kr I Ar I F I Ar II Ne I Cu II F I Ne I Kr II Ar II F I Kr II N II Xe I Ar II C I Kr II Kr II N II T I Ar II T I Ar II T I Ar II T I Ar II C I T I Ar II	1 25 20 4 10 20 4 10 20 1 10 4 1 3 10 50 1 1 15 2 3 ,5 4 1 50 3 12 2 4 0 3 25 5 1 30 9 50 2 2 8 8 8 60 50 8 2 2 5 1 3 5 2
9133,4 9132,53 9131,59 9131,21 9123,14 9122,9660	F I Xe I Kr II Ti I Ar I	1,4 3 6 5 500	9066 ,77 9063 ,78 9063 ,27 9062 ,47 9061 ,43 9060 ,749	Ar I N II He I C I C I Ar II	40 0 6 8 9
9122,63 9122,49 9121,14 9121,10	F I Kr I Ne I Cl I	40 20 20 75	9060 ,443 9060 ,472 9057 ,51 9057 ,23 9052 .54	N I Ar I Ar I Ne I	10 2 4 6

λ	Symbol	I	λ	Symbol	I
9051,236 9050,10 9049,890 9049,47 9049,06 9046,8 9045,878 9045,446 9045,40 9045,4 9044,55 9044,47 9042,10 9039,95 9039,0 9038,96 9036,98 9035,915 9032,18 9032,18 9032,64 9031,35 9028,918 9027,32 9025,67 9025,49 9021,58 9018,162 9017,596 9015,19 9014,938	Ar II Cl I N I N I N I Ne I Ne I NE I Cl I Ne Kr II Kr I F I Kr II Ne I Ar II Xe I Ar II Ti I Xe I Kr II F I Kr II F I F I F I F I F I F I F I F I F I	1 1 4 12 5 3 1 13 400 40 2 10 3 400 20 3 3 30 6 3 50 1 1 1 9 15 30 10 350 15 10 1 7 0,7	8986, 15 8983, 84 8983, 65 8983, 28 8981, 18 8981, 05 8980, 10 8977, 99 8975, 408 8971, 365 8971, 36 8970, 98 8968, 6 8967, 53 8967, 53 8967, 53 8967, 39 8964, 48 8963, 66 8962, 34 8962, 19 8960, 75 8952, 254 8952, 78 8952, 254 8949, 10 8948, 12 8948, 01 8948, 01 8948, 01 8948, 204 8943, 483 8942, 962 8941, 47	Symbol N II Si I F I N II F I Xe I Cl I Kr II Kr I Fe I Ar II N II Ar I Ar II Ar I Ar I Cl I E I C I Si IV Xe I Xe I Si I Ne I C I Si I Ne I Ne I	1 4 4 3,5 3 12 100 2 15 50 10 4 1 2 4 2 10 2 10 4 7 50 2000 2000 2 6
9014,911 9012,457 9012,098 9011,639 9010,39 9008,51 9008,455 9006,19 9006,15 8999,564 8999,19	H D Fe I T N II Si I Ar II F I Kr II Fe I Kr I	3 3 30 3 1 15 6 50 10 200 30	8941,47 8937,530 8936,61 8935,448 8931,326 8931,20 8930,83 8930,04 8929,24 8928,6920 8927,4	Ne I Ar II F I Ar II Ar II Cl I Xe I N II Ne I Kr I Ne I	6 1 0,7 1 5 2 200 1 10 2000 2
8999,11 8997,803 8997,156 8996,978 8996,2 8995,865 8994,99 8992,84 8991,692 8989,44 8989,026 8988,58 8988,58	Kr II Ar II Mg I He I Cu I Ar II Ar I Mg I Ti I Mg I Ne I Ar I Xe I Ar II	6 4 10 2 20 7 10 1 9 12 7 200 3 200 6	8927,36 8926,819 8926,074 8925,504 8925,436 8925,436 8923,555 8923,555 8923,312 8921,14 8920,198 8919,4987 8916,89 8915,522 8915,44 8914,74	Ca II Ar II Ar II Al I K I Si I Mg I Al I K I Li I Ar II Ne I F I Ar II	11 1 3 4 4 4 10 20 9 5 0 2 300 2 1 3

λ	Symbol	I	λ	Symbol	I
8914,43 8913,0 8912,900 8912,88 8912,78	F I Ne I Al I Cl I F I	7 3 7 40 300	8841 ,70 8841 ,277 8840 ,82 8840 ,39	Cl I Al I Ar I Ar I	15 10 20 3
8912 ,07	Ca II	10	8840,09	Kr II	4
8910 ,27	F I	140	8839,9	Xe II	3
8908 ,73	Xe I	200	8838,433	Fe I	30
8908 ,26	Kr II	3	8838,009	Ar II	1
8905,650	Ar II	6	8835,082	Mg II	11
8904,512	Ar II	1	8833,42	Kr II	3
8904,34	C I	2	8831,232	F I	100
8904,017	K I	12	8830,9078	Ne I	50
8903 ,20	CI	1	8829 ,38	Kr II	5
8902 ,66	XeII	5	8828 ,909	Al I	8
8902 ,188	KI	13	8824 ,323	Mg II	10
8900 ,92	FI	1000	8824 ,227	Fe I	250
8899 ,92	FI	60	8821 ,14	Ti I	12
8899 ,297	Ar II	3	8820,70	Cl II	5
8895 ,6	Ne I	2	8820,45	O I	15
8895 ,42	Ar I	1	8820,36	Ne I	6
8895 ,144	Ar II	1	8819,60	O I	5
8893 ,32	N II	1	8819,56	N II	2
8892 ,7277	Si I	20	8819 ,412	Xe I	5000
8892 ,22	Ne I	10	8819 ,39	Ti I	8
8891 ,70	Ar I	1	8819 ,37	Ar I	1
8890 ,67	C I	2	8815 ,28	Cl I	30
8890 ,147	Ar II	4	8810 ,10	Kr II	2
8885 ,71	Xe I	10	8807 ,582	F I	900
8881 ,48	Xe II	2	8806 ,757	Mg I	50
8874 ,84	Ar I	4	8805 ,78	Kr I	20
8873 ,39	C I	3	8805 ,16	Ar I	3
8870 ,32	Kr I	4	8804 ,65	Kr II	3
8870,216 8869,40 8867,170 8866,961 8865,7562 8865,3057	Ar II Xe II Ar II Fe I Ne I Ne I	1 2 2 150 500 100	8804,624 8804,61 8803,860 8799,9 8799,36	Fe I Xe II Ar II C II F I	10 30 1 0 70
8863,303	Ti I	3	8799,082	Ar I	100
8862,787	H	2	8798,65	Kr II	3
8862,32	Xe I	300	8796,92	Xe II	2
8860,374	D	2	8796,142	Ar II	5
8859,570	T	2	8794,40	Ti I	8
8855,74 8855,40 8853,8669 8851,44	Al II Xe II N II Ne I Xe I	5 0 700 1	8793 ,8 8793 ,376 8792 ,51 8792 ,50 8790 ,3889	C II Fe I Ne I F I Si I	1 120 30 35 35
8850,659	Ar II	1	8790 ,555	Ar II	1
8849,97	Ar I	150	8785 ,88	Xe II	4
8849,06	F I	70	8785 ,63	F I	14
8846,46	N II	1	8784 ,59	Ar I	30
8846,17	Ar I	1	8783 ,7539	Ne I	1000
8844,502	F I	120	8782,014	Ne I	50
8842,527	Ar II	1	8780,747	Si I	11
8842,46	Kr I	3	8780,6223	Ne I	1200
8842,1	Ne	2	8 7 80,25	Kr I	30

		.			
λ	Symbol	I	λ	Symbol	I
8778,75 8778,66 8777,73 8776,7490 8776,74	Ne I Ti I F I Kr I He I	150 30 120 6000 2	8725 ,76 8722 ,17 8719 ,56 8719 ,374	Ti I Kr I Ti I Ar II	6 1 30 3
8774,05 8773,896 8773,00 8772,95 8772,866	Kr I Al I Kr I N II Al I	50 14 4 3 13	8718 ,841 8717 ,825 8717 ,31 8716 ,947 8716 ,19	N I Mg I Kr II Ar II Xe II	14 13 2 1 50
8771 ,855 8771 ,6592 8768 ,215 8767 ,55	Ar II Ne I Ar II Ne I	15 400 1 15	8714,52 8713,79 8713,69 8713,62 8712,689	Ne I Ar I Cl I Kr I Mg I	5 5 3 2 12
8767,053 8766,422 8766,64 8766,61 8764,112	K I Si I Ti I F I Kr I	3 14 75 10 150	8711 ,708 8711 ,58 8711 ,54 8710 ,54	N I Cl I Xe I N II	15 1 2 6
8764,00 8763,955 8763,39 8761,6907	Fe I K I N II Ar I	100 4 1 200	8710,29 8710,175 8709,64 8707,61 8704,1132	Fe I Mg I Xe I Kr II Ne I	20 10 40 8
8761 ,44 8761 ,415 8760 ,14 8758 ,20 8757 ,192	Ti I Cs I Xe II Xe I Fe I	15 500 6 100 25	8704,1132 8703,255 8700,95 8700,44 8699,002	N I Ar I Cl I N II	14 3 5 5
8755,20 8754,009 8753,08 8752,009	Kr I Ar II C I Si I	30 2 3 100	8697,79 8697,50 8696,86 8696,71 8694,900	N II Kr I Xe I C II N II	$\begin{array}{c} 3 \\ 40 \\ 200 \\ 5 \\ 4 \end{array}$
8752 ,14 8751 ,174 8750 ,475 8748 ,093 8747 ,357	Xe II Si I H D N I	7 10 — — 9	8693,086 8692,34 8692,20 8690,19	Ar II Ti I Xe I Kr II	2 100 100 100
8747,298 8747,29 8746,43 8745,657 8742,4509 8742,49	T Kr I Kr I Mg II Si I Kr I		8690 ,12 8688 ,632 8687 ,430 8686 ,28 8686 ,161 8683 ,400	Ar I Fe I N II Cl I N I N I	2 1500 5 30 14 16
8741 ,26 8739 ,51 8739 ,39 8737 ,31 8737 ,270 8736 ,63	Ar I Ar I Xe I Ti I F I Ar I	1 3 300 7 140 20	8682 ,99 8682 ,56 8681 ,9216 8680 ,31 8680 ,270	Ti I C II Ne I Al II N I	125 8 500 3 17
8736 ,19 8736 ,021 8734 ,990 8734 ,70 8732 ,80	Ar I Mg I Mg II Ti I F I	2 17 10 75 6	8680 ,079 8679 ,4898 8678 ,43 8676 ,076 8675 ,38	Si I Ne I Ar I N II Ti I	11 500 60 7 150
8728,909 8728,019 8728,0110 8726,54	N I Si III Si I Kr I	10 3 40 8	8675 ,28 8674 ,92 8674 ,767 8674 ,751 8674 ,26	Al II Al II Ar II Fe I Kr II	1 2 1 60 2

λ	Symbol	I	λ	Symbol	I
8673 ,48 8672 ,62 8671 ,28 8667 ,9438	Kr I F I Al II Ar I	2 35 1 400	8610 ,67 8609 ,26 8707 ,611 8606 ,64	Kr I Cu II Ar II Cu II	5 3 2 1
8667,71 8665,22 8665,021 8664,63 8663,65	F I C III H F I C III	$ \begin{array}{c} 1 \\ 3 \\ \hline 6 \\ 2 \end{array} $	8606,06 8606,014 8605,85 8605,7790 8604,47	F I Si I Kr I Ar I F I	6 8 40 150 1,4
8662 ,140 8661 ,907 8660 ,52 8657 ,390 8656 ,93	Ca II Fe I N II Ar II F I	16 600 3 1 0,8	8604,32 8604,23 8604,016 8600,98 8599,4	N II Xe II Ar II Ti I Kr I	3 50 6 25 1
8655 ,869 8655 ,72 8655 ,5206 8654 ,3837 8653 ,38	N I Xe II Ne I Ne I N II	14 3 400 1500 3	8598,394 8598,18 8597,0470 8595,962	H Ti I Si I Si I	$ \begin{array}{r} $
8652,6 8651,50 8651,49 8650,889 8649,922	C III Kr II Kr I Na I Na I	5 8 6 7	8595 ,91 8594 ,005 8593 ,1 8592 ,624 8591 ,2583	Kr II N I Kr I Ar II Ne I	15 10 3 400
8648,4622 8648,54 8647,114 8647,0400 8642,89	Si I Xe I Si I Ne I Ar I	50 250 15 300	8586,00 8585,96 8585,262 8584,0 8584,0	O I Cl I Ar II Cu I Xe II	100 3 10
8641 ,75 8641 ,47 8640 ,7 8638 ,31 8636 ,4	Cl I Ti I Al II N II Xe II	3 40 8 3 2	8582,91 8582,267 8579,49 8578,40 8578,06	Ne I Fe I Ar I Ti I	60 15 4 15
8636,38 8635,31 8634,84 8634,6472 8632,81	Ti I Ne I Cl I Ne I Kr I	18 50 2 600 1	8577,98 8576,01 8575,25 8571,3535	Ar I Cl I Xe I Cl I Ne I	7 200 75 100
8631,5 8631,102 8629,33 8629,238	Kr I Kr I Ar II Ti I N I Xe II	1 1 18 16 25	8569 ,72 8569 ,02 8567 ,735 8566 ,7 8565 ,45	Ti I Kr I N I Xe II Ti I	50 20 14 2 25
8628 ,94 8628 ,70 8628 ,61 8624 ,82 8624 ,24	Kr I Cl I Kr I Xe I	1 4 4 80	8565,13 8564,7 8563,59 8563,38 8562,550	Ar I Xe I Kr II Ar I Ar II	1 1 2 1 2
8623,804 8621,612 8620,4602 8619,34 8618,44	Ar II Fe I Ar I Kr II Ti I	5 10 100 1 20	8561 ,38 8560 ,89 8556 ,7803 8553 ,97 8551 ,33	Ar I Kr I Si I Xe I Kr II	$\begin{array}{c} 3 \\ 50 \\ 120 \\ 2 \\ 2 \end{array}$
8618,14 8613,58 8612,91 8612,58 8611,807	Ti I Kr II Ti I F I Fe I	15 2 7 6 40	8550,54 8550,46 8548,07 8547,023 8545,384	Ti I Cl I Ti I Ar II H	25 20 100 4

					_
λ	Symbol	I	λ	Symbol	I
8544,6952 8542,089 8539,36 8537,98 8537,93	Ne I Ca II Ti I Kr II Kr I	60 17 60 3 40	8468 ,46 8468 ,413 8467 ,8 8467 ,32 8467 ,256	Ti I Fe I Xe II Cl I H	100 300 1 25
8537,04 8536,26 8536,1645 8531,36 8530,10	F I C I Si I Ti I Xe I	7 1 40 15 30	8467,15 8466,483 8465,352 8464,92 8463,3569 8460,96	Ti I Mg I Li I Kr II Ne I Ti I	75 2 4 4 4 150 7
8526,36 8525,99 8523,88 8522,55 8521,4428	Ti I Ti I Kr II Xe I Ar I	8 8 3 30 2000	8457,10 8450,89 8450,37 8446,758	Ti I Ti I Xe I O I	40 75 1 29
8521 ,149 8519 ,72 8518 ,37 8518 ,05 8515 ,19	Cs I Cl I Ti I Ti I Xe II	4000 8 100 60 50	8446,6 8446,359 8446,250 8443,982 8443,44 8442,98 8440,26	Xe II O I O I Si I Ar I Ti I Ar I	2 30 27 40 20 20
8515,08 8514,075 8511,04 8510,45 8508,8700 8508,66	Fe I Fe I Cu II C I Kr I O I	20 150 40 1 3000	8439,603 8438,93 8438,742 8437,958 8437,71	Fe I Ti I N II H Ar I	$ \begin{array}{r} 20 \\ 75 \\ \hline 11 \\ \hline 6 \end{array} $
8505,112 8503,46 8503,449 8502,487 8502,2207	K I Cu II K I H Si I	10 15 11 —	8437,55 8435,68 8435,24 8434,98 8432,37	Xe I Ti I Si I Ti I Kr II C I	300 8 300 1
8501,547 8500,997 8500,96 8500,32 8498,21	Si I Ar II Xe II C III Kr I	40 2 2 10 30	8430,88 8429,128 8428,342 8428,25 8426,50 8426,326	0 I 0 I Cl I Ti I 0 I	1 2 100 200 4
8498,018 8497,32 8496,64 8496,03 8495,51 8495,3591	Ca II Cl I Ar I Ti I Ti I Ne I	13 5 2 60 15 500	8424,780 8424,6473 8424,41 8423,10	O I Ar I Ti I Ti I O I	1 2500 50 20
8494,42 8492,078 8490,30 8488,85	Ti I Si I Ar I Cl I	30 15 40	8420,968 8419,996 8418,70 8418,4265 8417,54	K I Ti I Ne I Ti I	1 1 10 400 25
8484 ,4424 8483 ,16 8482 ,64 8477 ,26	Ne I Ti I Xe II Cu II	80 25 5 10	8417,535 8417,161 8416,97 8414,49	K I Ne I Ti I C II	2 100 60 1
8477,20 8473,694 8473,31 8472,96 8470,72	Kr I Mg I Kr II Cl I Ne I	2 7 100 3 5	8413,42 8413,321 8412,428 8412,36	C II H Kr I Ti I	2 — 100 150
8469 ,96 8468 ,845	Kr I Mg I	$\frac{2}{5}$	8411,88 8411,14 8409,190	Ar II Kr II Xe I	$\frac{1}{1}$ 2000

λ	Symbol	I	λ	Symbol	I
8408 ,2094 8408 ,15 8406 ,20 8403 ,70 8402 ,54	Ar I Cu I Cl I Cl I Ti I	3000 20 10 1 5	8347 ,94 8347 ,45 8347 ,24 8346 ,823 8346 ,420	C III Xe I Xe II Xe I Ar II	5 60 100 2000 1
8402,03 8399,35 8397,61 8396,93 8395,734	Xe I Ar I Cl I Ti I Ar II	5 20 3 90 3	8346 ,120 8345 ,556 8345 ,553 8345 ,183	Mg I F I H Ar II	$ \begin{array}{r} 15 \\ 120 \\ \hline 2 \end{array} $
8392 ,400 8392 ,37 8392 ,28 8392 ,20	HI Xe I Ar I Cl I	20 80 15	8343 ,90 8342 ,630 8341 ,931 8341 ,59 8339 ,431	Cl I Ar II Si III C III Fe I	50 1 2 6 80
8391 ,96 8391 ,44 8390 ,223 8389 ,48 8387 ,780	Cl II K I K I Ti I Fe I	3 — 3 25 1200	8338,328 8338,384 8335,15 8333,785	Si I Ar II C I H Cl I	20 1 13 — 5000
8384,90 8384,73 8383,58 8382,82	Kr I Ar I Cl I Ti I	15 60 4 90	8333,27 8333,14 8332,99 8332,73 8332,21	Kr II C III Kr I Ar I	2 7 1
8382 ,76 8382 ,54 8378 ,87 8378 ,3 8377 ,90	Cl II Ti I Kr II Xe II Ti I	$ \begin{array}{r} 5 \\ 100 \\ 2 \\ 3 \\ 100 \end{array} $	8331,941 8329,44 8327,907 8327,063	Fe I Xe II Ar II Fe I	200 30 2 1200
8377,6062 8376,41 8376,079 8375,95	Ne I Ne I Ar II Cl I	800 200 2 150	8324 ,58 8323 ,90 8323 ,428 8321 ,09 8317 ,39	Xe I Xe I H Kr I Si I	$ \begin{array}{c} 20 \\ \hline 2 \\ \hline 2 \\ \hline 15 \end{array} $
8375 ,93 8374 ,478 8372 ,79 8371 ,38 8367 ,03	Kr I H Xe I Xe I Ar I	5 - 5 3 3	8317 ,10 8316 ,2 8314 ,262 8310 ,264	Xe II Xe II H Mg I	40 10 - 10
8366 ,4 8365 ,7464 8365 ,642 8363 ,52	Xe II Ne I Fe I Al II	30 150 25 8	8306 ,710 8305 ,596 8306 ,115 8305 ,02	Si I Mg I H Ar I	25 9 1 5
8363,30 8363,074 8361,81 8361,69	Al II Ar II Cl II He I	1 2 8 10	8304,69 8303,79 8303,313 8303,20 8302,40	Cl I Ar I Mg I Kr I F I	7 10 600
8360,63 8359,57 8359,23 8359,006 8358,72	C III H Al II Cl II	$ \begin{array}{c} 15 \\ 9 \\ 1 \\ \hline 2 \end{array} $	8301 ,54 8301 ,39 8300 ,3248 8298 ,837	Ne I Kr I	150 20 600
8358,28 8357,86 8355,30 8354,35	Cl I C III Ar I Al II	6 2 1 10	8298 ,581 8298 ,581 8298 ,1077 8297 ,71 8297 ,55	F I Kr I Xe I Xe II	2000 5000 15 100
8353 ,50 8353 ,00 8351 ,3 8349 ,05	Ar I Cl II Xe II Xe I	4 2 3 40	8296 ,723 8296 ,51 8296 ,205 8294 ,675	Ar II C III N II Si I	1 1 4 13

λ	Symbol	I	λ	Symbol	I
8293,527 8292,615 8292,309 8291,88 8287,56	Fe I Si III H Ar I Kr I	$\frac{20}{3} - \frac{3}{8}$	8235 ,30 8234 ,639 8233 ,194 8233 ,085 8232 ,347	Cu II Mg II Mg II O I Fe I	10 11 7 13 50
8286 ,67 8286 ,434 8285 ,70 8283 ,21 8282 ,85	Cl I H Xe II Cu II Xe II	5 15 60 15	8232 ,19 8231 ,6348 8230 ,773 8230 ,642 8230 ,016	FI Xe I FI Si I O I	500 10000 3000 35 10
8281 ,125 8281 ,0495 8280 ,95 8280 ,1163 8278 ,44	II Kr I Cl I Xe I F I	1500 7 7000 2	8228 ,89 8227 ,680 8224 ,72 8223 ,121 8222 ,924	Kr I O I Ar I N I Mg II	10 10 6 13
8277,60 8276,310 8274,615 8273,79 8272,355	Cu II H F I Cl I Kr I	50 1500 7 100	8222,69 8221,84 8221,829 8221,73 8220,406	Kr I O I O I Cl I Fe I	6 15 20 75 150
8272 ,26 8271 ,944 8271 ,70 8271 ,377 8269 ,324	C III Si III Cl I Si III Si III	1 6 7 5 8	8220,40 8218,40 8217,817 8216,317 8215,15	Cl I Kr I Ar II N I Si I	60 80 1 15
8269 ,15 8267 ,97 8267 ,117 8266 ,519 8266 ,0788	Cl I Cl I Ne I Xe I Ne I	60 3 80 500 200	8214,85 8214,726 8213,989 8213,50	Xe II F I Mg II Xe II	$20 \\ 2500 \\ 10 \\ 2$
8265,640 8264,5221 8263,2398 8262,73 8262,568	Si III Ar I Kr I Xe II Si III	5 1500 3000 30 9	8213,034 8212,24 8212,05 8212,00 8210,708	Mg I Kr I Si III Cl I N I	20 5 2 100 11
8262 ,49 8260 ,81 8259 ,521 8259 ,3795 8258 ,64	F I Xe II Ar II Ne I Cl I	12 5 2 150 4	8210,1 8209,839 8208,634 8207,667 8206,62	Kr I Mg I F I Fe I Kr I	1 10 350 40 40
8256, 90 8256, 40 8255, 62 8255, 07 8254, 725	Cu II Xe II C III Ar I Ca II	5 20 1 50 7	8206,40 8206,341 8205,22 8203,76 8203,42	Cl I Xe I Kr I Cl I Ar I	700 20 12 20
8251 ,743 8251 ,30 8250 ,180 8249 ,58 8248 ,797	K I Xe II K I Ar I Ca II	8 2 9 4 11	8202,72 8201,766 8201,720 8201,43	Kr II N I Ca II N I	$200 \\ 7 \\ 10 \\ 2$
8248,6812 8248,151 8245,37 8242,374 8240,606	Ne I Fe I Xe II N I Si IV	30 30 4 13	8200 ,95 8200 ,357 8200 ,20 8199 ,02 8198 ,951	Cl I N I Cl I Cl I Fe I	25 10 35 35 80
8239,130 8236,77 8235,408	Fe I He II O I	8 5	8197,734 8196,73 8196,48 8195,070	F I Xe I C III Kr I	60 2 10 50

		1	<u> </u>		1
λ	Symbol	I	λ	Symbol	I
8194,8237 8194,7905 8194,71 8194,35 8194,18 8192,4 8192,28 8191,679 8191,241 8191,16 8190,431 8190,258 8190,0543 8188,005 8186,9 8184,852	Na I Na I Si III Cl I Si III Kr I Cu II Si III F I Si III Ar II Kr I N I Xe II	9 1 3 50 3 50 3 2 30 8 300 6 7 1 3000 13 10 13	8129,55 8129,26 8129,170 8128,908 8126,56 8126,378 8123,44 8123,29 8121,40 8120,434 8120,16 8119,72 8119,18 8118,5495 8118,29 8117,75	Cl I F I N I Ne I F I Li I Kr II Xe I Cl I Mg II Xe II Al II Ar I Ne I Xe I	2 600 3 60 350 300 4 2 5 8 30 1,5 50 100 15 4
8183,2556 8182,93 8179,339 8178,96 8178,84 8178,68 8174,50	Na I Xe I F I Ar I Ar I Kr II N I	5 1 600 20 40 2	8115,94 8115,3108 8115,220 8112,900 8110,65 8109,46	Xe II Ar I Mg II Kr I Ar II Xe I	50 5000 9 6000 1 15
8171, 95 8171, 288 8171, 288 8171, 02 8170, 09 8167, 55 8166, 51	Ar I Si I Xe I Cl I Xe II N I	10 25 100 10 10	8107,91 8105,631 8104,3642 8104,02 8103,6920	Xe I N I Kr I Kr I Ar I Si III	6 2 4000 500 2000
8166 ,235 8165 ,405 8165 ,37 8162 ,170 8161 ,52 8160 ,15	N I Ar II Xe I Si I Cl I Al II	8 3 2 15 12 3	8102,862 8101,98 8098,724 8098,55 8097,24 8095,96	Si III Xe I Mg I Xe II Xe I Kr II	9 100 10 12 3 3
8159 ,51 8159 ,132 8157 ,25 8154 ,872	F I Mg I Kr II Si I	300 2 10 15	8095 ,55 8095 ,13 8094 ,76 8094 ,06	Cu II Xe II Cl I Ar I	40 10 12 20
8154,644 8151,86 8151,80 8150,66	Mg I Ar I Xe II N I	1 3 100 1 1	8093 ,241 8093 ,08 8092 ,634 8089 ,93	Si I Ne I Cu I Ar I	70 2 2000 5
8150,647 8147,70 8145,15 8144,96 8144,8	Ar II Kr II Kr II Kr I Xe II	1 100 45 3 10	8088 ,58 8087 ,69 8086 ,67 8085 ,54 8085 ,20	Cu II Cl I Cl I Cl I Fe I	20 20 75 60 200
8143,54 8142,17 8142,13 8140,55 8136,83	Ar I Kr II Xe II Si I Xe II	10 1 5 15 30 300	8084 ,48 8083 ,75 8083 ,80 8082 ,4576 8080 ,31	Cl I Ar II C I Ne I Xe II	35 1 5 200 50
8136,4061 8132,98 8132,96 8131,40 8130,03	Ne I Kr I Kr II Xe II Kr II	60 6 20 10	8079,68 8079,618 8079,0332 8078,923 8078,48	Ar I K I Cs I Cs I C I	20 6 1000 100 4

	Comple at	·		Sumbal	
λ	Symbol	I	λ	Symbol	I
8078,114 8077,521 8076,64 8076,298 8076,06	K I F I C II Al I Ne I	7 350 8 2 1	8024,11 8023,85 8023,30 8021,9 8021,26	Ne I Xe II Cl I Ar I C I	2 50 18 2 3
8075,519 8075,46 8075,353 8073,99 8071,285	F I Cu II Al I Xe I Si I	900 2 8 1 25	8021,14 8020,504 8020,07 8018,12 8018,56	C III Ca II Xe II F I C I	1 2 5 8 1
8070,97 $8070,598$ $8070,42$ $8066,60$ $8065,968$ $8064,94$	Xe II Si I C I Ar I Al I Xe I	50 25 3 20 6	8017,542 8017,502 8015,7235 8015,57 8014,7853 8014,26	Ar II Ca II Cs I Cl I Ar I Xe II	2 2 200 45 800 50
8062,78 8062,36 8062,12 8061,340 8059,5038	C II C I C II Xe I Kr I	6 3 5 150 1500	8011,05 8009,05 8008,45 8007,79 8006,1566	FI FI XeII FI ArI	5 1 300 15 600
8058,62 8057,258 8054,232 8053,35 8053,305 8051,08	C I Xe I Mg I Cs I Ar I Cl I	8 200 7 100 100 20	8005,8 8003,26 8003,186 8001,95 7998,972 7997,80	Xe II Xe I Al I Xe II Fe I Cl I	2 10 7 10 700 50
8049,854 8048,32 8047,73 8047,60 8047,28 8046,13	Mg I C II Mg I Fe I Xe II Ar I	5 3 3 15 20 50	7996,72 7996,53 7996,5 7995,074 7994,473	Cu II Ti I Xe II O I Fe I	10 3 3 15 20
8046 ,073 8045 ,33 8044 ,50 8044 ,308 8042 ,18	Fe I C I Si II Ar II Xe I	600 4 15 2 15	7993 ,42 7993 ,22 7993 ,12 7993 ,048 7992 ,90	C I Kr II Kr I Al I Ar II	3 200 5 5 1
8041,79 8040,931 8040,56 8040,50 8039,39 8038,26	Ne I F I Xe I Kr I C II Xe II	2 1000 10 8 6 100	7992,53 7992,34 7991,5 7990,78 7990,68	C I Xe II Xe II Kr I Cs I	$0 \\ 100 \\ 5 \\ 2 \\ 100$
8037,76 8037,23 8036,853 8035,619 8035,40	C II Ar I Ar II Si I Xe II	100 5 20 2 35 20	7988,17 7987,99 7987,89 7987,333 7986,977	Cu II Xe II C I O I O I	60 40 2 11 13
8034,625 8033,52 8031,64 8029,67 8028,86	Ar II Kr I Xe II Xe I C II	1 2 100 100 2	7985,80 7983,61 7982,406 7982,398 7981,941	Cl I Ar II Kr I O I O I	4 1 100 11 10
8028 ,341 8028 ,0 8026 ,950 8026 ,45	Fe I Xe II Si I Cu II	50 1 25 10	7981 ,82 7981 ,19 7981 ,1 7980 ,58 7978 ,96	Kr I Kr I Xe II Cl I F I	30 20 100 15 5

λ	Symbol	I	λ	Symbol	I
7978,88 7976,95 7976,4 7976,03 7975,579	Ti I Cl I Xe II Xe I Si I	4 25 3 8 13	7930 ,806 7929 ,65 7928 ,5996 7927 ,35	Mg I F I Kr I Ar II	7 4 180 2
7974,76 7974,72 7973,62 7972,01	Xe II Cl I Kr II Cu II	20 20 120 8	7927 ,1172 7925 ,850 7924 ,62 7920 ,48 7920 ,47	Ne I Si I Cl I Xe II Kr I	40 15 100 10 40
7970 ,306 7968 ,66 7967 ,341 7965 ,08 7962 ,62	Si I Cl I Xe I Ar I Kr I	35 3 500 3 1	7918 ,3857 7916 ,45 7915 ,813 7915 ,419	Si I Ar I Ar II N I	90 20 1 7
7960 ,84 7957 ,67 7957 ,07 7956 ,99	Ar I Kr I Kr II Ar I	2 2 3 10	7915,09 7913,432 7913,4242 7912,867 7912,383	Cl I Si I Kr I Fe I Si I	$25 \\ 25 \\ 200 \\ 6 \\ 20$
7956 ,832 7956 ,32 7955 ,371 7954 ,22 7954 ,09	KI FI KI XeI FI	4 300 5 4 60	7911 ,47 7910 ,23 7906 ,91 7904 ,770	Si II Ar I Ar I Ar II	10 4 1 2
7952,66 7952,49 7952,19 7952,182	FI ClI CI OI	2 15 3 9	7904,62 7902,57 7899,28 7899,27 7898,985	Kr I Cu II Cl I N I N I	30 25 45 3 8
7951 ,35 7950 ,824 7949 ,17 7948 ,52 7948 ,1755	C I O I Ti I F I Ar I	1 10 3 40 400	7898 ,558 7898 ,10 7897 ,7 7897 ,62	F I Cl I Xe II N II	500 5 5 4
7947,566 7947,204 7946,99 7945,878	O I O I Kr I Fe I	10 3 20 600	7895 ,368 7895 ,83 7893 ,33 7891 ,0777	Mg II Cu II Cl I Ar I	13 20 10 100
7944,60 7944,42 7944,16 7944,0011	C I Cu II Ne I Si I	3 25 20 140	7890,56 7889,62 7889,4 7887,395	Cu II F I Xe II Xe I	3 8 50 300 4
7943 ,8820 7943 ,1805 7943 ,178 7942 ,54 7941 ,09	Cs I Ne I O I Xe II Fe I	800 200 6 100 10	7886 ,31 7886 ,00 7882 ,71 7882 ,36 7881 ,76	O I Cl I Xe II Kr I Kr I	6 20 10 30
7940 ,65 7939 ,49 7938 ,90 7938 ,34	Cl I O I Cl I Kr I	2 1 8 2	7881,667 7881,320 7879,18 7878,22	Mg I Xe I F I Cl I	100 300 75
7937 ,41 7937 ,166 7936 ,9946 7936 ,314	Xe I Fe I Ne I F I Cl I	40 700 70 350 50	7877,051 7875,56 7872,50 7871,93	Mg II F I Cl I Kr I	12 18 1 2
7933 ,85 7933 ,130 7932 ,3490 7931 ,41 7930 ,93	Cu I Si I Kr II F I	1500 120 40 220	7870,68 7868,20 7863,91 7862,7 7861,91	Cl I Ar I Kr I Xe II Ar I	1 40 20 3 15

					
λ	Symbol	I	λ	Symbol	I
7860,89 7860,58 7860,44 7855,73 7854,8215 7853,29 7852,86 7849,967 7849,72 7849,397 7848,80 7848,25 7846,555 7845,03 7841,23 7840,40 7840,28 7840,04 7840,01 7839,42 7839,0550 7837,40 7837,11 7836,134 7835,309 7833,06 7832,98 7832,63 7832,224 7830,76 7830,21 7828,28 7825,80 7825,66 7823,72	C I Cu II Ar I Ar I Kr I C I Si I Si II C I Ar II C I Ar II C I Ar II C I I C I I I I I I I I I I I I I I	8 5 2 8 800 1 4 30 500 3 400 4 2 25 15 4 2 1 8 8 8 30 6 3 12 11 7 10 3 400 3 0 6 3 12 11 11 7	7800,212 7800,008 7798,59 7798,55 7796,00 7795,410 7791,90 7790,56 7790,53 7789,42 7787,75 7787,04 7786,66 7786,500 7783,66 7781,97 7780,586 7780,42 7778,74 7777,82 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,4 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1 7776,28 7777,1	FI Si I CI I Ar I C III Ar II Kr II Mg II CI I Xe I Xe I Kr I Mg II Xe I Kr I Mg II Xe I Kr II Fe I C III Cu II Cu II Cl I Xe II Cl I Xe II Kr I O I Xe II Kr I O I Kr I	15000 30 5 30 4 2 6 4 15 4 100 2 5 50 100 300 3 30 10 10 15 26 4 27 5 20 28 12 30 5 10 10 10 10 10 10 10 10 10 10
7823,72 7822,59 7821,35 7820,79 7820,57 7818,31 7816,15 7815,83 7815,34 7814,33 7813,76 7812,33 7811,135 7810,237			7762,237 7759,297 7757,003 7756,52 7754,78 7754,696 7754,37 7753,28 7752,905 7749,16 7749,16 7748,278 7746,828	N II Mg I Ar II Kr II Cl I F I Cu II Ar II Si IV Kr I Kr II Fe I Kr I	10 1 1 30 6 18000 10 1 1 1 25 50
7810,237 7810,06 7809,781 7808,04 7807,66 7806,52 7805,8 7805,19 7802,651 7802,27 7802,252	Cl I Na I Fe I Cu II Kr I Xe II Cu II Xe I Cu II	3 4 6 75 15 1 25 100 6 1	7746,343 7744,94 7744,09 7742,71 7741,39 7740,31 7738,68 7735,69 7730,469 7726,64 7726,2	Mg I Cl I Cu II Si I Kr I Xe I Cu II Kr II Si IV Cu II C IV	1 125 5 40 10 40 30 250 1 5 6

λ	Symbol	I	λ	Symbol	I
7579 ,87 7579 ,02 7578 ,16 7578 ,07 7576 ,68	Cu II Cu II C III Cl II C III	10 30 4 10 2	7486 ,862 7486 ,52 7486 ,225 7484 ,24	Kr I C III Mg I Ar I	100 3 5 15
7573,384 7572,06 7570,93 7570,09	F I Ne I Xe I Cu I	5000 5 6 200	7483,44 7482,723 7482,19 7480,652 7479,148	C I F I Si I O I O I	3 2200 25 8 8
7568,925 7565,53 7563,214 7562,01	Fe I Cl II Al I Cu II	30 18 3 25	7477,146 7477,264 7476,54 7476,473 7476,18	O I F I O I C I	7 70 12 2
7561, 19 7559, 79 7554, 162 7552, 235 7550, 63	Cl I Xe I Al I F I Kr I	4 40 1 5000 3	7474,01 7473,30 7473,226 7472,4383	Xe I C I O I Ne I	25 1 5 50
7548,45 7547,06 7544,0439 7543,10	Xe II Cl I Ne I Kr I	300 100 100 3	7472,01 7471,374 7471,37 7471,1676 7470,09	Xe I O I Al II Ar I C I	40 2 1 4 1
7535,7739 7531,471 7530,70 7530,60	Ne I Fe I Xe II C II	300 60 50 2	7468,41 7468,309 7467,99 7466,322	Ca I N I Kr II Si III	$\begin{matrix} 3\\16\\6\\9\end{matrix}$
7524,46 7519,86 7519,50 7515,88	Kr II C II C II Fe II	300 4 7 6	7465,669 7465,645 7465,45 7465,01	Si III F I C I Kr I	4 4000 1 3
7515, 48 7514, 96 7514, 919 7514, 6514 7514, 54	Kr II Xe I F I Ar I Xe I	20 3 900 200 8	7462,624 7462,40 7462,38 7461,890	Si III Cl I Fe II Si III	8 8 20 5
7511,045 7510,42 7508,90 7508,6	Fe I Ar I C II Xe II	800 10 3 1	7460 ,82 7459 ,70 7459 ,42 7455 ,996	Xe III Kr I Cl I Ar II	5 1 3 2
7507,28 7505,67 7505,31 7505,153 7503,8685	Fe I C I C II Ar II Ar I	8 1 2 1 700	7455,36 7454,08 7452,5 7451,00	Si I Cl I Cu I Xe I	25 2 2 25
7503,00 7501,13 7497,286 7496,56	Xe II Xe I Si III Cl I	20 3 1	7449 ,12 7448 ,9 7445 ,776 7445 ,34 7444 ,32	Al II Xe III Fe I Fe II Cl I	5 1 200 6 3
7495,36 7495,088 7494,15 7493,58	Xe II Fe I Kr I Kr I	50 400 30 20	7442,327 7442,299 7441,94 7440,60	Si III N I Xe I Ti I	4 15 20 3
7492 ,23 7492 ,12 7491 ,678 7489 ,46	Xe I Cl I Fe I Cl I	20 10 12 8	7440 ,491 7438 ,8981 7438 ,15	Ar II Ne I Cu II O V	300 15
7489 ,46 7489 ,155 7488 ,8712	F I Ne I	2500 500	7438 7436 ,25 7436 ,13	Ar I Cl I	10 10

λ	Symbol	I	λ	Symbol	I
7435 ,78 7435 ,71 7435 ,33 7434 ,74 7433 ,85	Kr II Cl I Ar I Kr II Cu II	200 7 30 15 5	7362 ,83 7362 ,297 7361 ,568 7361 ,34 7359 ,97	Kr I Al I Al I Kr I Kr II	4 9 8 1 3
7428 ,574 7427 ,2 7425 ,54 7425 ,290 7424 ,60 7424 .05	Ar II Cu I Kr I Ar I Si I Xe I	2 5 60 12 85	7359,96 7358,338 7357,74 7355,58 7355,48	Kr I Ar II Ti I Xe I Kr I	5 2 3 40 4
7424,03 7423,639 7423,4969 7422,26 7420,70 7419,341 7415,9462	N I Si I Ar I Cu II Ar II Si I	$egin{array}{c} 20 \\ 14 \\ 425 \\ 6 \\ 8 \\ 1 \\ 275 \\ \end{array}$	7355,180 7353,96 7353,42 7353,316 7350,78 7348,049	Ar II C III Kr III Ar I Ar I Ar II	2 0 1 100 6 7
7415,35 7414,10 7412,334 7411,178 7410,14 7409,0818 7408,467	Si I Cl I Ar I Fe I Xe II Si I Si III	40 90 15 100 4 200 3	7345 ,34 7344 ,72 7343 ,37 7342 ,74 7342 ,00 7341 ,16	Ar I Ti I Xe II Cl I Cl I Kr I	1 4 30 3 1 2 300
7407,02 7407,02 7405,774 7405,77 7404,51 7404,34 7402,70	Kr II Si I Xe I Xe I Cu II Kr I	400 375 3 12 100 1	7339 ,30 7336 ,480 7334 ,66 7334 ,33 7331 ,957 7331 ,74	Xe II Xe I Fe II Kr I F I Cu II Cl I	500 50 8 4 5000 15 3
7400 ,5 7400 ,41 7399 ,89 7398 ,688 7395 ,52	Xe II Xe I Cu II F I Si I	4 30 20 10000 15	7329,33 7327,8 7327,00 7326,146 7326,02 7325,57	N V Kr I Ca I Cu II Ne I	5 400 15 15 2
7393 ,793 7392 ,97 7389 ,425 7389 ,28 7387 ,685	Xe I Ar I Fe I Cl II Mg I	150 15 80 7 12 5	7323,05 7320,70 7319,94 7319,33 7316,87 7316,272	Xe I Fe II Xe I F I Xe I Xe I	40 15 6 20 70
7387,004 7386,402 7386,002 7383,9796 7382,47	Mg I Fe I Xe I Ar I Cl I Cu II	8 100 400 3 10	7316,0068 7314,303 7313,77 7313,01 7312,452	Ar I F I F I Xe I Xe I	30 700 40 1 80
7380,92 7380,433 7378,38 7376,46 7373,491 7373,229 7373,00	Cl I Ar II Xe II Fe II Na I Na I Si I	4 15 30 20 1 2 35	7312,29 7311,724 7311,019 7310,24 7309,033 7307,957 7307,93	Si II Ar I F I Fe II Fe II Ne I	3 100 15000 6 1000 50 15
7373,00 7372,65 7372,1189 7367,02 7366,80 7364,73	CI I Ar I Kr I Kr I C I	1 100 2 2 2 3	7307 ,37 7306 ,60 7304 ,82 7301 ,80 7301 ,29	Xe I Cu II Ne I Xe II Kr II	5 12 30 200 4

λ	Symbol	I	λ	Symbol	I
7301 ,25 7298 ,98 7298 ,93	Kr I F I Xe III	5 150 1	7241 ,32 7240 ,12 7239 ,885	C I F I Fe I	2 2 8
7293 ,068 7291 ,060 7290 ,26	Fe I Mg I Si I	15 10 55	7238,20 7237,17 7236,42	Xe I C II C II	3 7 20
7289 ,78 7289 ,1730 7288 ,760 7287 ,36	Kr II Si I Fe I Fe II	400 400 10 6	7235 ,82 7235 ,326 7234 ,58	Si I Si I Kr I	$\begin{array}{c} 60 \\ 100 \\ 2 \end{array}$
7287,36 7287,262 7286,11 7285,301	Kr I C I Xe I	80 0 60	7233 ,546 7233 ,52 7231 ,32 7229 ,93	Ar II Kr II C II Ar I	15 1 18 4
7284,44 7284,34 7284,236	Ar I Xe II Ar II	6 100 4	7229 ,01 7228 ,5356 7227 ,34	Cs Cs I Kr I	$\begin{array}{c} 35 \\ 500 \\ 2 \end{array}$
7283,961 7282,81 7281,349	Xe I Si I He I	40 40 500	7226 ,206 7224 ,51 7224 ,24	Si I Fe II C I	100 12 1
7280 ,454 7279 ,9570 7279 ,895	Ar II Cs I Cs I	2 500 100	7224,103 7223,668 7222,39 7220,24	Kr I Fe I Fe II Xe I	100 12 8 1
7279 ,75 7276 ,47 7275 ,294 7272 ,97	Xe II Xe II Si I Kr II	4 4 160 4	7219,70 7216,20 7216,03	Cs I Ti I C I	15 5 0
7272 ,9349 7270 ,70 7270 ,66	Ar I Cs I Ar I	100 15 10	7215 ,97 7215 ,06 7213 ,13	Xe II N II Kr II	$ \begin{array}{c} 20 \\ 3 \\ 250 \end{array} $
7268 ,28 7267 ,20 7267 ,090	Kr I Ar I Si III Xe I	1 2 2	7212,29 7211,836 7210,52 7209,44	C III Si III C III Ti I	$egin{array}{c} 1 \\ 1 \\ 2 \\ 20 \end{array}$
7266 ,49 7265 ,173 7264 ,99	Ar I Fe II	25 3 10	7209 ,14 7208 ,21 7207 ,406	Xe I Si I Fe I	5 25 500
7262 ,54 7258 ,6 7257 ,94 7256 ,63	Xe I Xe II Xe I Cl I	$\begin{array}{c} 20 \\ 2 \\ 60 \\ 125 \end{array}$	7206,9812 7205,99 7202,55	Ar I Cs Ar I	100 2 2
7256 ,53 7255 ,83 7254 ,529	N II Cu II O I	2 20 17	$\begin{array}{c} 7202,360 \\ 7202,26 \\ 7202,194 \\ 7200,79 \end{array}$	F I C I Ca I Xe I	$ \begin{array}{r} 15000 \\ 2 \\ 200 \\ 15 \end{array} $
7254,447 7254,154 7252,48	Cl I O I O I	20 19 3	7200 ,59 7194 ,94 7194 ,92	Kr I Cl I Cu II	2 5 15
7251 ,74 7250 ,87 7250 ,625	Ti I Xe I Si I	8 5 180	7193,90 7193,58 7193,56	Si I Si I Cu I	30 65 50
7250 ,14 7249 ,92 7248 ,99	Si I Xe I Cs	25 2 2	7193 ,23 7193 ,172 7188 ,32	Fe II Mg I Cs	$\begin{smallmatrix}8\\10\\2\end{smallmatrix}$
7245 ,38 7245 ,1665 7244 ,94 7244 ,86	Xe II Ne I Xe I Ti I	$ \begin{array}{c} 2 \\ 1000 \\ 20 \\ 10 \end{array} $	7188,20 7187,341 7185,92	N II Fe I Xe III	$\begin{array}{c}2\\800\\2\end{array}$
7244,76 7241,56	Cl I Kr II	$\frac{3}{2}$	7185,68 7184,89 7184,57	Cl I Si I Si I	$\begin{array}{c} 2 \\ 70 \\ 20 \end{array}$

λ	Symbol	I	λ	Symbol	I
7182,098 7180,47 7177,50 7176,34 7174,90 7173,9380 7172,70	Ar II Kr I Ile II Ar I Xe III Ne I Xe I	$ \begin{array}{r} 2 \\ 3 \\ -4 \\ 2 \end{array} $ 1000 10	7119,67 7119,598 7116,99 7115,63 7115,19 7113,04 7113,18	C I C II C II C II	7 500 8 10 9 7
7166 ,676 7165 ,545 7164 ,83 7164 ,69 7164 ,469 7162 ,57	Mg II Si I Xe II Si I Fe I Ar I	2 200 800 70 250 8	7112,48 7112,2 7111,48 7111,30 7109,61	C II Ne I C I N IV F I	6 10 7 1 3
7160 ,88 7158 ,83 7157 ,360 7156 ,81 7156 ,80 7154 ,29 7152 ,21	Cs Ar I O I Kr II O I Cu I Kr I	2 30 7 1 12 5 5	7109,40 7108,94 7107,4777 7103,28 7101,190 7100,8 7100,12	N IV C I Ar I N IV Ar II Xe II C I	3 3 200 1 1 2 5
7151,08 7149,554 7149,03 7148,147 7147,80 7147,50	Si III Cs Xe II Ca I Cl II Xe II	2 10 300 500 3 100	7094,20 7093,25 7090,560 7090,404 7089,51 7087,83	Cl I C I Ar II Fe I Kr I C I	8 3 1 40 1 4 25
7147,0408 7146,38 7144,19 7143,81 7143,45 7139,99 7138,87	Ar I Cl I C II Xe II Kr I Kr II N II	30 5 1 8 8 60 4	7086,80 7086,70 7086,43 7085,72 7085,51 7084,644 7083,968	Cl I Ar I Kr I Cs C I Al I Al I	25 15 1 2 0 6 5
7138,57 7138,70 7136,57 7135,040 7134,99 7134,11 7133,67 7133,27	Ne I Xe I Li I Fe II C II Kr I Xe II	30 15 1 5 6 1	7082 ,35 7082 ,15 7078 ,46 7078 ,44 7077 ,024	Cl I Xe II Xe I Kr II Ar II C I	$\begin{array}{c} 3 \\ 200 \\ 1 \\ 3 \\ 5 \\ 2 \end{array}$
7132,45 7132,11 7130,942 7130,532 7129,18 7127,890	C II C I Fe I Cs N IV F I	1 150 5 30000	7075,64 7075,0 7074,98 7074,86 7073,97 7072,43	Cl I Xe II Cl II C I Kr II Xe II	3 2 4 1 60 4
7127,35 7127,27 7125,84 7125,825 7125,73	Cl I N IV Si II Ar I C II	3 1 4 30 7	7068,73 7068,413 7068,410 7067,44 7067,2175 7065,707	Ar I Fe I Si IV Fe II Ar I He I He I	$\begin{array}{c} 30 \\ 40 \\ 4 \end{array}$ $\begin{array}{c} 20 \\ 400 \\ 300 \\ 2500 \end{array}$
7125,37 7124,66 7122,98 7122,20 7121,740 7121,18 7119,90	Ne Cu I N IV C I Ar II Cs C II	3 5 1 4 2 12	7065,190 7064,42 7063,70 7063,624 7060,409 7060,18 7059,1079	Ne I C II Al II Mg I Cl I	2300 2 8 3 8 2 200

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	λ	Symbol	I	λ	Symbol	I
	7058 ,25 7057 ,45 7057 ,27 7056 ,87	Cl I Kr III Kr I C I	1 2 10 0	7001,62 7000,79 7000,05	Kr I Kr I Cu I	2 7 2
	7056,56 7054,993	Al II Ar II	4 3	6999 ,902 6998 ,358 6995 ,88	Fe I Si IV Cl I	$\begin{matrix} 30 \\ 3 \\ 12 \end{matrix}$
	7053 ,09 7052 ,57 7051 ,2937	C II Xe II Ne I	6 3 70	6993 ,27 6993 ,05	Cl II Kr I	$\frac{2}{2}$
	7051,06 7049,36 7049,34 7049,07	Xe I Xe I Xe III Xe I	3 1 2 1	6992 ,88 6992 ,17 6991 ,65 6990 ,88 6990 ,122	Si I Ar I Xe I Xe II Ar II	$ \begin{array}{r} 15 \\ 4 \\ 1 \\ 2000 \\ 5 \end{array} $
	7047 ,939 7047 ,58 7047 ,37	Si IV Si III Xe I	6 5 30	6985,708 $6983,4912$	Ar II Cs I	$\begin{array}{c} 1 \\ 25 \end{array}$
	7046 ,26 7043 ,94 7042 ,056	C II Xe III Al II	4 4 5	6982,69 $6982,05$ $6982,02$	F I Xe I N I	1 30 00
	7039 ,37 7038 ,80	Cu I Ti I	$\begin{array}{c} 25 \\ 6 \end{array}$	6981 ,85 6979 ,681 6979 ,60	Cl I Cs Cl I	25 15 3
	7038 ,251 7037 ,469 7037 ,25	Fe I F I C III	40 45000 7	6979 ,10 6978 ,856	N I Fe I	1 100
	7036 ,30 7035 ,53	Cl I Xe I	20	6977 ,95 6977 ,95 6977 ,00	Kr II Kr III Cl I	3 3 5
	7034,903 7034,80 7032,4128 7030,2519	Si I Xe I Ne I Ar I	250 3 1000 100	6976 ,523 6976 ,182 6975 ,64	Si I Xe I N II	80 100 4
	7026 ,62 7025 ,52	Si I O I	25	6973 ,2966 6972 ,674 6971 ,71	Cs I Mg I F I	500 5
	7024,649 7024,0500 7022,976	Fe I Ne I Fe I	10 500 50	6968 ,34 6966 ,81	Cu I N II	5
	7022 ,75 7022 ,56	Cu II Kr II	$\frac{2}{2}$	6966 ,80 6966 ,349 6965 ,430	Cl I F I Ar I	8 4000 400
	7019,30 7019,02 7017,646 7017,28	Cl I Xe I Si I Si I	30 90 30	6965 ,404 6964 ,672 6964 ,18	Mg I K I K I	6 12 7
	7017,06 7016,74	Xe II Si I	80 10	6962 ,50 6962 ,31 6960 ,23	Cl I C I Ar I	$\begin{array}{c} 6 \\ 0 \\ 20 \end{array}$
	7016 ,436 7016 ,075 7014 ,73	Fe I Fe I N II	60 20 2	6955,519 6952,13 6951,50	Cs II Cl II N I	20 25
	7013 ,98 7011 ,24 7008 ,62	N II Cl I Kr I	2 3 2	6951 ,46 6951 ,261	Ar I Fe I	1 20 25
	7008,00 7006,30	Cl I	10 4	6945,22 $6945,208$ $6944,06$	N I Fe I Kr II	4 150 10
	7005 ,883 7004,06 7003 ,96	Si I O IV Xe II	$\frac{180}{50}$	6942 ,11 6941 ,752	Xe II N II	1000 5
	7003 ,5665 7003 ,10	Si I Xe I	180	6938 ,767 6937 ,6658 6936 ,69	K I Ar I Xe I	20 100 8
50	7002 ,228 7001 ,915	O I O I	17 15	6936 ,284 6935 ,82	K I Cu I	12 5
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λ	Symbol	I	λ	Symbol	I
6935,62 6935,38 6932,90 6931,39 6930,45 6929,4672 6926,90 6925,53 6925,35 6925,010 6924,67 6924,40 6922,22 6920,31 6920,06 6919,96 6917,93 6916,702 6911,29 6911,084 6910,75 6910,32 6910,75 6910,32 6910,22 6909,816 6909,0 6908,11 6906,54 6904,68 6904,22 6902,475 6900,880 6899,64 6895,29 6895,005	Xe I Kr I Cl I O IV Cl II Ne I N I Xe I Cl I Ar I Xe I Cl I Cu I Al II Fe I Kr I Kr I Kr I Kr I Kr I Kr I The I Kr I The	50 2 25 4 1000 1 100 6 2 15 5 8 3 50 1 1 60 2 19 30 3 6 100 6000 — 2 4 100 100 100 100 100 100 100	8872,107 6872,05 6871,2898 6870,85 6870,4552 6870,419 6870,215 6869,74 6869,63 6869,580 6868,80 6867,22 6866,838 6865,58 6863,535 6863,20 6862,82 6862,71 6861,47 6861,270 6860,19 6858,164 6857,27 6857,030 6856,030 6857,27 6857,030 6856,030 6855,179 6854,45 6853,70 6853,32 6851,884 6851,65	Symbol Xe I C III Ar I Kr II Cs I Cs I F I O II Kr I N II C III Si I Xe I CI I Ar II Xe I C III Ti I Ar II Xe I C III Ti I Ar II Xe I C III Kr I Ar I Si III C III Si III C III	100 4 150 40 200 2 8000 1 20 4 1 20 50 5 8 20 20 3 3 6 15 40 40 2 3 50 10 10 10 10 10 10 10 10 10 1
6900 ,880 6899 ,64 6895 ,29	Ar II C III O II	$\frac{2}{1}$	6851 ,65 6851 ,20 6851 ,18	C III Si III	1 3
6887,834 6887,10 6886,618 6885,77 6885,07 6882,155 6881,94 6881,99 6879,59 6878,5 6876,69 6874,30 6873,2 6872,85	N II Ar I Ar II Fe I O II Xe I Cu I C III Ar I O V Xe II N I Xe II Cl I Cu II	5 20 20 20 1 300 10 1 40 - 3 1 10 6 3	6846,540 6846,40 6844,84 6844,27 6843,671 6841,86 6841,74 6841,50 6841,349 6840,99 6840,96 6840,23 6839,584 6837,74 6837,60	Ar II Kr I Xe I Xe I Fe I Cl II Xe I Fe I Cu I Xe I Cl I Xf I Ff I Cl I Ar II Ff I Cl I	1 20 2 1 60 10 6 20 80 3 8 15 4 5

λ	Symbol	I	λ	Symbol	1
6837,094 6834,38 6834,264 6834,094 6834,08 6831,62	Al II Si III F I N II Si III Cl II	3 2 9000 6 4 30	6790 ,20 6789 ,8 6789 ,21 6788 ,71 6787 ,851 6787 ,22	Cl I O V Kr I Xe II Mg II C II	2 - 1 100 8 6
6831,560 6830,1 6829,82 6829,09 6828,610	Si III O V Si II Kr I Fe I	6 8 40 8 50	6784 ,45 6783 ,90 6781 ,451 6780 ,61 6780 ,40	Cl I C II Mg II C II Cu II	1 10 7 5 3
6828,42 6827,315 6827,2529 6825,56 6825,22	C I Xe I Ar I F I Cs	6 200 30 15 15	6779 ,933 6779 ,93 6778 ,60 6777 ,57 6776 ,623	Ar I C II Xe I Xe I Si III	$egin{array}{c} 4 \\ 8 \\ 40 \\ 50 \\ 2 \end{array}$
6824,6520 6823,40 6823,382 6821,86 6819,4	Cs I Cu II Al II Cu I O V	200 3 2 2 —	6776,45 6775,64 6774,93 6773,984 6773,37	Kr I Cu I C III F I C III	3 2 0 7000 1
6819,270 6818,45 6818,38 6818,371 6818,291	Mg II Si II Xe I Ar II Ar I	8 20 15 8 4	6771,22 6770,70 6767,12 6767,007 6766,8	Kr II Cu II Xe I F I O V	50 8 10 50
6818,13 6818,12 6816,827 6816,50 6815,64	Kr III Xe III Al II Cl I Xe I	1 1 2 12	6766 ,6134 6766 ,54 6765 ,20 6764 ,51	Ar I F I Cl I Kr I	100 5 3 2
6813,10 6812,860 6812,29 6811,67 6811,50	Kr I Mg II C II F I Cl I	50 7 3 1	6764 ,43 6763 ,61 6763 ,325 6762 ,934 6762 ,30	Kr II Kr II F I F I Cl I	80 100 5 70 2
6810,25 6810,04 6809,989 6809,90	Fe I Cl I N II Cu II Ar II	20 15 7 4	6762 ,17 6759 ,586 6759 ,42 6758 ,60	C III Ne I Cl II N I	4 15 35 4
6806,851 6806,85 6806,60 6805,74	Fe I F I Cu II Xe II	10 10 4 1000	6758,55 6757,75 6756,548 6756,10 6755,16	Cu II Cl I Ar II Ar I C II	8 5 20 100 3
6805,244 $6801,31$ $6800,68$ $6799,288$ $6798,51$	Si III N II C II Ar II Ca I	4 1 7 3 6	6754,30 6752,8347 6752,40 6751,88 6751,54	Ar I Ar I N I Si II Cl I	8 100 4 5
6798 ,11 6795 ,528 6795 ,40 6793 ,82 6793 ,53	C II F I Kr I N I Kr III	3 1500 4 00 3	6750,55 6750,28 6750,155 6744,38	C II Si II Fe I C III	4 8 20 100
6791 ,92 6791 ,47 6790 ,37	Cl I C II Xe II	3 7 80	6743 ,124 6742 ,43 6742 ,24 6741 ,90	Ti I C II C III F I	10 3 5 1

λ	Symbol	I	λ	Symbol	I
6741,64 6741,29 6741,12	Si I N I Cu I	30 3 100	6698 ,474 6697 ,45 6696 ,296	Ar I Cl I Ar II	6 2 4
6740,10 $6738,62$ $6738,058$ $6737,76$	Kr I C II Ne I F I	20 6 70 6	6696,023 6694,32 6691,22 6690,481	Al I Xe II Xe II F I	13 400 1 1800
6737 ,64 6734 ,00 6733 ,58 6733 ,48	Cu II C II C II N I	5 2 2 6	6689,91 6688,79 6686,04 6684,73	Ar I C I Cl II Ar I	$\begin{array}{c}2\\4\\45\\6\end{array}$
6731,07 6731,04 6730,24 6728,41	C II C III Cl I Kr III	5 6 5 1	6684,307 6683,95 6683,55 6683,26	Ar II C I Kr III He II	50 4 1
6728,008 6727,39 6727,19 6726,538	Xe I C III C II O I	200 6 4 6	6681,036 6681,03 6680,26	Xe I Cl II Ti II Si II	20 15 1 3
6726 ,478 6726 ,283 6724 ,56 6724 ,476	Fe I O I C II Cs	20 9 2 15	6679,65 6678,972 6678,39 6678,2764	Xe I Cl I Ne I	25 10 500
6723 ,65 6723 ,40 6723 ,36	C II Cl I Kr I Cs I	1 4 4 500	6678 ,19 6678 ,151 6677 ,994 6677 ,2812	O II IIe I Fe I Ar I	0 1000 600 30
6723 ,2943 6723 ,12 6722 ,893 6721 ,853	N I Ar I Si I	9 4 100	6674 ,11 6672 ,23 6672 ,10 6671 ,88	C I Cu I Ar I Si II	4 10 2 100
6721,35 6719,2193 6717,911 6717,685 6717,2	O II Ar I Ti II Ca I N V	5 100 1 500	6671 ,84 6668 ,920 6667 ,556 6667 ,00	C I Xe I Si IV F I	5 150 5 7
6717,0428 6717,04 6714,65	Ne I Si II Cl I	70 50 ·4	6666 ,965 6666 ,94 6666 ,8967	Xe I O II Ne I	60 1 100
6713 ,43 6713 ,12 6711 ,29 6709 ,90	Cl I Cl I	40 1 1 15	6666 ,75 6666 ,356 6665 ,00 6664 ,85	N I Ar II Si II Xe I	0 15 15 4
6709 ,86 6708 ,81 6708 ,282 6707 ,807	Ca I N I F I Li I	1 4 400 1000	6664,0533 6663,444 6663,1 6663,04	Ar I Fe I Xe II C I	100 80 2 4
6706,46 6706,20 6705,117 6703,574	Xe I N I Fe I Fe I	1 4 15 10	6662 .73 6661 ,68 6660 ,99	C I Cl II Cu II Ar I	3 75 8 100
6703,20 6702,25 6701,207 6699,40	Cl I Xe II Si IV Cl I	6 80 7 3	6660,6784 6660,62 6660,52 6657,92	F I Si II Xe I	12 50 20
6699 ,38 6699 ,228 6698 ,8752 6698 ,673	Si II Kr I Ar I Al I	20 60 100 11	6657,499 6655,51 6656,88 6656,510 6654,61	Ar II C I Ar I N I C I	2 6 6 1 3

λ	Symbol	I	λ	Symbol	I
6653,95 6653,78 6653,75 6653,583 6653,458	C I O I Cl II Ar II N I	1 5 25 1 5	6614,96 6614,354 6613,622 6613,31	Xe II Ar II N II Xe II	10 6 5 4
6652,239 6652,0925 6651,97 6651,75	Kr I Ne I F I Kr III	40 150 0,5 10	6612,38 6611,35 6611,196 6611,04	Kr I C I Ar II F I	2 4 2 5
6650,405 6649,51 6649,22 6648,75	F I F I Cu II Xe I	400 6 2 3	$\begin{array}{c} 6610,565 \\ 6609,55 \\ 6609,26 \\ 6609,117 \end{array}$	N II F I Cl I Fe I	13 2,5 7 30
6647,94 6646,564 6646,510 6644,963	Kr I Cs N I N I	2 15 2 9	6608 ,87 6607 ,73 6607 ,41 6606 ,77 6605 ,79	Xe I F I Xe I N I C I	10 2,5 30 00 1
6643,716 6643,10 6642,9 6641,41	Ar II Cl I Xe II Cu II	100 1 1 1	6605,12 6605,00 6604,86 6604,8542	Kr I Kr II F I Ar I	2 15 0,6 30
6640,90 6640,80 6640,012 6639,743	O II Ne I Ne I Ar II	4 5 10 30	6604,57 6604,02 6602,907 6602,90	Cl I Ar I Ne I Kr II	7 2 100 10
6638,85 6638,226 6636,938 6635,65 6634,789	Xe II Ar II N I Si I N II	2 50 4 25 3	6602,90 6602,87 6602,42	Kr III Xe I C I Cl I	10 4 2 3
6634,766634,366634,1366633,772	Cu I Kr II Xe II Fe I	2 15 6 50	6600,10 6599,725 6599,112 6598,9529	F I Ti I Ne I	$\begin{array}{c} 6\\12\\1000\end{array}$
6632,464 6632,44 6632,087 6631,85	Xe I Xe II Ar I Cu II	50 2 8 2 2 2	6598 ,84 6598 ,684 6597 ,607 6597 ,25 6596 ,90	Xe II Ar I Fe I Xe II F I	80 6 15 300 0,8
6630 ,834 6630 ,44 6629 ,795 6629 ,67	Mg I Xe I N II Cu I	2 2 7 5	6596,85 6596,85 6596,1155 6595,666	C I F I Ar I N II	1 8 8 3
6628,6605 6627,96 6627,62 6627,28	Cs I Kr II O II Fe II	35 2 3 5	6595 ,561 6595 ,24 6595 ,01 6595 ,00	Xe I C I Xe II K II	100 1 800
6627,02 6624,29 6624,22 6622,543	N I Cu II Kr II N I	0 8 2 3	6594 ,66 6593 ,875 6592 ,920	Ar I Fé I Fe I	2 2 60 300
6622,05 6621,61 6620,977 6620,569	C II Cu I Ar II Mg II	1 30 6 6	6591,45 6590,86 6589,21 6588,69	C I Xe I F I Fe II	1 8 4 5
6620,440 6620,02 6618,40 6617,23	Mg II Xe II Xe II C I	5 200 50 0	6587,61 6586,5096 6586,27 6586,022 6583,71	C I Cs I C I Cs I Si I	$ \begin{array}{r} 8 \\ 500 \\ 2 \\ 35 \\ 15 \end{array} $

2	Symbol	,	2	Symbol	T
\$\\ 6583,36\\ 6583,27\\ 6582,88\\ 6581,60\\ 6580,389\\ 6578,77\\ 6578,05\\ 6576,42\\ 6575,180\\ 6573,68\\ 6573,61\\ 6572,781\\ 6570,07\\ 6569,694\\ 68	F I Xe I C II Ar I F I C I C II Kr I Ti I Fe I Xe II F I Ca I Ar I Kr II F I	2 20 15 2 300 12 2 18 20 3 30 30 5 50 2	6546,245 6546,12 6545,973 6545,530 6544,162 6543,360 6542,40 6541,93 6540,409 6538,1137 6536,55 6536,440 6536,10 6535,163 6533,159 6532,927 6532,8824	Symbol Fe I Xe I Mg II N II N II Xe I Cl I Cu II Ar II Ar I Kr I Cs II Cl I Si III Xe I Ar II	200 20 11 3 4 40 8 2 2 30 8 15 1 2 100 2
6569,224 6569,14 6569,13 6568,71 6567,35 6565,90 6565,32 6564,50 6564,20 6564,170 6563,59 6563,19 6562,849 6562,725 6561,78 6561,032 6560,65 6560,556 6560,556	Fe I F I Xe II C I Cl I Cl I Kr II Cu II N II Ar II F I Xe II H N II D Xe I Si I T N II He II Xe I	50 7 5 2 3 1 6 10 3 3 7 15 2000 1000 3 3000 4 25 3000 3	6532,550 6531,39 6530,52 6530,30 6528,65 6527,1989 6527,16 6526,609 6524,357 6522,626 6522,38 6521,508 6521,485 6521,14 6518,73 6518,374 6517,01 6516,053 6515,48	N II Cl I Ar I Cu II Xe II Si I He II Si III N II Cl II Xe I Si III Fe I Fe II Fe II Xe II Ar I	5 20 1 8 200 45 45 6 4 2 10 40 3 14 20 20 5 20 1
6559,580 6557,724 6556,70 6556,066 6555,69 6555,56 6555,4624 6555,05 6554,47 6554,236 6554,196 6553,93 6553,66 6551,58 6551,488 6551,28 6550,80 6547,350 6546,276	Ti II Ar II Xe II Ti I Kr I Kr I Si I Cu II N II Ti I Xe I Cu II Ar II Cl I Ar II Ti I	1 2 4 25 6 2 45 5 3 20 50 6 4 2 3 3 3 20	6512,83 6512,71 6510,95 6510,14 6509,089 6509,00 6508,742 6508,37 6508,184 6508,135 6507,50 6506,5279 6506,45 6506,33 6506,33 6506,45 6504,89 6504,608 6504,18	Xe II F I Kr II Kr II Cl I Ca I Kr I Ar II Ti I Xe I Ne I N I Fe II Cs II Ar II Xr II	300 12 100 8 6 2 1 3 6 3 100 0 6 5 3 10 6 200

λ	Symbol	I	λ	Symbol	I
6502,21 6502,157 6502,08 6501,348	Cl I Ar II F I Ar II	5 3 18 4	6470 ,152 6469 ,705 6469 ,214 6468 ,77	Cu II Xe I Fe I N III	50 300 15 00
6500,37 6500,216 6499,649 6499,52 6499,109	Xe I Ar II Ca I N I Ar I	15 12 30 3 6	6468 ,32 6468 ,050 6466 ,86 6466 ,60	N I Ar II N III Cu II	4 7 4 3
6498,950 6498,718 6497,689 6497,43	Fe I Xe I Ti I Xe I	5 100 3 30	6466,5505 6465,32 6464,70 6464,60 6463,50	Ar I Cl II Ca I Cl I F I	20 3 1 1 70
6496 ,456 6495 ,528 6494 ,985 6494 ,04 6493 ,971	Fe I Cs II Fe I Cu II Ar I	20 15 1000 30 15	6463,03 6462,730 6462,566 6461,95	N III Fe I Ca I C II	$\begin{array}{c} 2\\ 30\\ 125\\ 5 \end{array}$
6493,780 6493,7 6493,05 6491,79	Ca I Kr II Fe II N II	80 2 8 2	6461,50 6461,48 6460,33 6458,403 6457,93	Xe I Xe II C III Ar II N I	3 3 0 2 3
6491,61 6491,28 6490,55 6488,07 6487,765	Ti II N I Cl I Kr I Xe I	2 3 1 15 120	6457,69 6457,54 6457,14 6457,06	N II Cu II Cl I F I	0 3 1 0,8
6487 ,55 6485 ,18 6484 ,88 6484 ,46	N III Cu I N I Cu II	0 5 9 20	6456 ,874 6456 ,489 6456 ,376 6456 ,2910	Ca II Ar II Fe II Kr I	8 3 200 200
6483,75 6483,076 6482,74 6482,053	N I Ar II N I N II	3 20 9 13	6455 ,975 6455 ,600 6454 ,77 6454 ,445	O I Ca I Val	19 10 1 18
6481 ,877 6481 ,73 6481 ,46 6481 ,141 6480 ,50	Fe I N I Cu II Ar I N I	20 2 15 8 0	6454,19 6453,95 6453,602 6453,32	Kr I N III O I F I N I	1 3 17
6480,085 6479,69 6478,69 6478,45	Ar II Xe II N III F I	2 2 2 8	6452 ,75 6452 ,29 6451 ,79 6450 ,78 6450 ,48	N I Si I Xe I N III Xe I	1 20 10 2
6478 ,07 6476 ,39 6475 ,632 6475 ,38 6475 ,312	Cl II F I Fe I Cl II Ar II	2 7 12 2 4	6450,30 6449,810 6448,78 6448,70	Cl I Ca I Kr I Xe I	7 12 50 10 2
6474,20 6472,841 6472,6226 6472,431	Cu I Xe I Cs I Ar II	10 150 15 6	6448,49 6448,49 6448,14 6447,69 6446,43	Cu II N I F I F I Fe II	10 0 0,6 6
6471,86 6471,660 6471,45 6471,03	Si III Ca I Cl I N I	2 40 3 1	6445 ,117 6445 ,05 6444 ,7118 6444 ,70	Ar II N III Ne I Kr III	1 2 150 1
6470,89	Kr II	50 ∥	6443,858	Ar II	8

λ	Symbol	I	λ	Symbol	I
6443,76 6443,47 6442,93 6442,3 6441,908 6441,70 6441,698 6440,95 6440,74 6439,073 6437,79 6437,604 6437,01 6434,79 6434,11 6433,683 6432,78 6432,78 6432,78 6432,654 6431,9693 6431,559 6430,852 6430,155 6428,05 6427,96 6426,73 6425,61 6424,144 6423,90 6422,93 6422,93 6422,93 6422,93 6422,87 6422,43 6421,7108 6421,47 6421,355 6421,0283 6420,47 6420,18 6419,977 6419,541 6419,25 6418,98 6418,98 6418,98 6418,98	Cl I Cu II Fe II Xe II Ar II N I Cu II N I Kr II Ca I Si I Ar II Cl I F I Ar II Cu II Fe II Cs I Ar I Fe I Xe I Xe I Xe II Cu II Fe I Xe I Xe I Cl I Ar II Cu II Fe I Xe I Xe II Cu II Ar II Cu II Cu II Cu III Cu II Cu II	2 5 6 1 9 5 40 3 5 150 8 8 4 4 15 15 15 1 1 3 8 4 15 15 300 20 00 5 2 2 8 8 4 1 30 3 6 2,5 7 100 100 100 100 100 100 100 100 100 1	6413,55 6412,53 6412,38 6411,659 6411,18 6410,17 6409,84 6409,753 6408,904 6408,05 6408,028 6407,27 6406,619 6406,44 6405,89 6405,171 6404,69 6403,70 6403,004 6402,2460 6401,076 6400,013 6399,41 6399,215 6399,16 6398,63 6397,99 6397,98 6397,98 6397,99 6397,184 6396,614 6395,16 6395,09 6394,75 6394,723 6394,75 6394,723 6394,75 6394,723 6394,75 6394,723 6394,75 6394,723 6394,75	C I Kr II Xe I Fe I Cu II Kr II Ne I Ar II Cl I Fe I Si I Mg I He II Ca I Fr I Kr II Ne I Ar II Ne I Ar II Ne I Ar II Cl I Fe I Cl II Ar II Cl I Ar II Cl I Ar II Ca I	3 4 10 400 10 5 10 150 6 7 60 15 6 3 60 3 5 6 2000 100 800 10 15 2 20 60 5 2 7 3 2 4 5 15 4 6 400 3 30 2 2 5 15 1 2 5
6417,54 6417,417 6417,05 6416,905 6416,61 6416,31 6416,3075 6415,65 6414,97 6414,62 6413,651	C I Ar II N I Fe II Kr II F I Ar I Kr I Si I Cu II F I	2 1 2 20 60 18 100 20 25 20 8000	6385,473 6385,17 6384,7189 6384,31 6384,13 6383,753 6383,095 6382,9914 6382,696 6380,77 6379,615	FI Ar I N II Cl II Fe II Ar II Ne I Ar II N IV N II	10 100 2 5 15 2 1000 3 8 9

λ	Symbol	1	λ	Symbol	I
6378,79 6377,84 6376,28 6375,945 6375,28 6374,292 6373,58 6373,37 6373,33 6373,27 6371,77 6371,65 6371,77 6371,65 6371,359 6369,5783 6369,128 6368,26 6367,98 6367,43 6366,354 6366,354 6366,282 6365,84 6365,5235 6365,440 6365,013 6364,8945 6363,34	Symbol C I Cu II Cl I Ar II Xe II O I Kr I Cl I F I Cu II Kr I F I Xe III Si II Ar I Ar II Kr I Cl I F I Cr I Cr I F I Tr	1 0 20 3 3 100 4 30 1 2 5 1 1000 30 2 4 3 10 8 3 10 8 3 10 2 4 30 30 4 4 30 30 4 4 30 30 4 4 30 4 4 30 4 4 30 8 8 8 8 8 8 8 8 8 8 8 8 8	6339,897 6337,58 6337,20 6336,104 6335,70 6335,335 6334,96 6334,4279 6333,97 6333,142 6332,832 6332,499 6331,969 6331,969 6331,50 6330,901 6328,6 6328,474 6328,39 6328,1646 6326,74 6326,2055 6326,117 6325,81 6325,45	Ar II Xe I C I Ti I C I Al II Fe I Cl I Ne I Xe I Ar II Fe II Si I Xe I Ne I O V Ar II N II N II N E I Cl I Cs I Ar II	3 8 1 8 0 5 10 4 1000 40 5 1 1 5 12 45 20 150 - 1 5 300 3 2 2 2 2 5
6362,8 6361,79 6359,896 6357,668 6357,569 6357,45 6357,025 6356,545 6356,545 6355,77 6354,5548 6353,25 6351,90 6351,8618 6350,76 6349,20 6348,601 6348,508 6348,601 6348,737 6346,66 6346,737 6346,66 6344,98 6344,61 6343,96 6343,29 6342,32 6341,66 6340,569	Xe II Ca I Ti I Ar II N II Cu II Ar II N II Xe II Xe I Xe I Xe I Xe I Ar I Ar I Ar II Ar II Ar II Ar II Ar II Ci II Ar I Ar II Ci II Ar I Ci I Ci I Ci I N II	2 5 8 5 15 6 6 6 500 200 200 50 8 100 2 2 10000 6 1000 9 5 10 20 2 10000 4 300 4 20 20 20 20 20 20 20 20 20 20 20 20 20	6325,22 6325,17 6324,682 6324,414 6323,735 6323,283 6322,42 6321,70 6321,59 6319,493 6319,236 6318,80 6318,716 6318,11 6318,062 6318,022 6318,00 6315,40 6314,97 6314,74 6314,459 6314,74 6314,459 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6313,6921 6314,459 6314,459 6314,459 6314,459 6314,459 6316,2240	Ti I Xe II O I Ar II Ar II O I Kr II N I Cl I Mg I Mg I N II Ca I Xe I Ti I Fe I Cu II Ar II Xe I F I Cu II Ti I Kr II Kr II Kr II Kr II Ar II	10 2 3 8 3 1 4 00 6 7 9 1 10 3 500 5 10 3 1 15 0,8 7 150 3 20 10 5 30 10 8

λ	Symbol	I	λ	Symbol	J
	i	<u> </u>			
6307 ,6598 6307 ,29	Ar I K II	$\frac{30}{7}$	6266 ,4950 6265 ,301	Ne I Xe I	$\begin{array}{c} 1000 \\ 40 \end{array}$
6305 ,956 6305 ,318	Cu II F e II	15 15	6264 ,346	ΟI	3
6305,01	Xe II	1	6263 ,696 6261 ,826	F I Cu II	18 40
6304,7892	Ne I	100	6261,55	O I Xe I	6 50
6303 ,754 6303 ,68	Ti I N I	10 0	6261 ,212 6261 ,101	Ti I	35
6303 ,66 6301 ,510	Kr II F e I	100 15	6260,16	Xe III	2
6300,988	Cu II	40	6259 ,59 6259 ,41	C II Ar I	4
6300 ,86 6298 ,31	Xe II Xe II	$\begin{array}{c} 100 \\ 20 \end{array}$	6259,22	O I	0
6296,8762	Ar I	20 12	6258 ,796 6258 ,706	Ne I Ti I	100 5 0
6296 ,646 6296 ,39	Ti I Xe II	10	6258 ,103 6257 ,86	Ti I Cu II	40 5
6295,446	Ar II	2	6257 ,84	Kr II	4
$6295,20 \\ 6294,45$	C II Xe I	$egin{matrix} 0 \ 15 \end{smallmatrix}$	6257 ,18 6256 ,84	C II	$\frac{2}{4}$
6293 ,7447	Ne I	100	6256,750	Mg I	$\frac{7}{2}$
$6292,649 \\ 6292,37$	Xe I C I	$\frac{50}{2}$	6256 ,54 6255 ,32	C ĬI Xe II	$\frac{2}{2}$
6290 ,96 6290 ,01	Kr II C II	3 1	6254 ,85	Si I	20
6288,72	Cu II	5	6254 ,690 6254 ,263	F I Fe I	$\frac{80}{6}$
6288 ,5975 6286 ,011	Cs I Xe I	$\frac{2}{100}$	6254 ,1876 6253 ,84	Si I C II	${\overset{180}{\overset{2}{}}}$
6285,78	ΝI	1 2	6253,60	Si I	15
$6285,70 \\ 6284,56$	N II C II	0	6252 ,732	Ne I	2
6284 ,41	Xe II	50	6252,561 6252,26	F e I Cl I	$\frac{20}{8}$
$6284,38 \ 6284,322$	Xe I N II	$\frac{2}{6}$	6250 ,98	Kr III	5
6282 ,823 6281 ,81	Ar II Xe I	1 5	6250 ,74 6250 ,2206	C II Cs I	$\frac{4}{2}$
6280,20	Cl I	5	6249 ,975	Ar II	1 5
6279,35 $6279,028$	Si I F I	15 9	6249 ,593 6248 ,4064	Ne I Ar I	15
6278,652	Ar I Xe II	6 300	6247 ,562	Fe II	80
6277 ,54		2	6246 ,7294 6246 ,59	Ne I K II	100 6
$6277,425 \ 6276,99$	Ar II Xe I	4	6246,57 6246,329	C II F e I	1 15
$6276,708 \\ 6276,624$	Cu II Cu II	10 10	6244 ,468	Si I	125
6276,039	Ne I	50	6243 ,8129	Si I	125
$6275,79 \\ 6275,43$	C II N I	1 1	6243 ,3958 6243 ,347	Ar I Al II	$\begin{matrix} 6 \\ 10 \end{matrix}$
6273,389	Ti I Cu II	$\begin{matrix} 6 \\ 60 \end{matrix}$	6243 ,125	Ar II	25
6273 ,330 6273 ,23	Xe I	10	6243,00 6242,70	Cl II C I	$\frac{2}{1}$
6273,018	Ne I	70	6242,54	Cl I N II	4 7
$6272,83 \ 6270,82$	N I Xe II	1 400	$\begin{array}{c} 6242,412 \\ 6242,09 \end{array}$	Xe I	8
6268 ,34 6268 ,30	Xe I Cu I	$\frac{1}{20}$	6241 ,39	Kr I	10
6268 ,30	Xe III	2	$\begin{array}{c} 6240,4 \\ 6239,713 \end{array}$	Li I Ar II	2 7
6267,33	Kr I	$\frac{1}{2}$	6239,651 6239,630	FI SiII	13000 100
6266 ,89	O I	υ	л 0200,000	51 11	66

λ	Symbol	I	λ	Symbol	I
6238,2871 6238,24 6237,3199 6237,27 6236,375 6236,375 6236,3520 6235,40 6234,04 6233,8 6232,892 6231,759 6231,48 6230,728 6230,74 6230,728 6230,74 6230,728 6230,11 6228,14 6227,18 6226,39 6226,193 6225,742 6225,356 6224,169 6223,66 6222,71 6221,66 6221,41 6221,11 6220,84 6220,460 6219,89 6219,818 6218,67 6217,5986 6217,2813 6216,910 6215,9423 6217,5986 6217,2813 6216,910 6215,9423 6217,5986 6217,5986 6217,2813 6218,67 6217,5986 6218,67 6217,5986 6217,5	Si I Xe III Si I C I Fe II Kr I Xe II Xe II He II Ar II Cl I Cs I Ar I Kr II Cl I I I I I I I I I I I I I I I I I I I	40 60 160 120 30 110 -2 7 8 1 40 10 25 3 1 6 3 5 50 18 40 20 25 8 2 1 12 40 40 20 25 8 2 1 100 60 60 60 60 60 100 100	6203,45 6202,981 6201,70 6201,52 6201,49 6201,099 6200,890 6198,260 6198,11 6196,63 6196,14 6195,49 6194,72 6194,07 6193,89 6193,66 6193,0663 6192,301 6191,40 6189,10 6189,10 6189,0649 6188,69 6187,54 6187,136 6186,860 6186,14 6185,93 6185,35 6185,26 6185,03 6185,35 6185,26 6185,03 6184,57 6184,16 6183,68 6183,42 6183,42 6183,42 6183,68 6183,42 6183,68 6183,42 6183,68 6183,77 6179,665 6179,41 6179,378 6179,378 6179,378 6179,378 6171,378 6172,290 6173,313 6173,0980 6172,821 6173,712	Xe II Ne I Al II Al II Al II Xe I Ar II Xe I Cu II Xe II Xe I Xe I Xe I Xe I Xe I Xe I	1 15 9 10 3 6 60 100 5 4 3 1 15 300 1 50 2 20 4 20 70 20 6 20 3 1 7 9 15 20 4 20 70 20 10 5 10 10 10 10 10 10 10 10 10 10 10 10 10
cco			•		

λ	Symbol	I	λ	Symbol	I
6172,020 6171,77 6170,6 6170,1761 6170,166 6169,835 6169,74 6169,559 6169,055 6168,80 6167,755 6167,628 6166,790 6166,628 6166,443 6165,38 6165,123 6164,76 6164,136 6163,96 6163,96 6163,95 6163,758 6163,758 6163,65 6163,65 6163,758 6163,758 6163,758 6163,758 6163,758 6163,758 6163,758 6163,758 6163,758 6163,758 6163,5939 6162,172 6162,16 6162,05 6161,289 6160,7470 6160,16 6159,97 6158,183 6156,145 6156,10 6155,975 6155,2393 6155,70 6155,359 6155,2393 6155,17 6155,338 6155,2393 6155,17 6155,338 6155,2393 6155,17 6155,338	Cu II Kr II He II Ar I N II Si III Fe III Ca I Ca I Kr II N II Ar II Ar II Ar II Kr III F I Ca I Cu II Ca I Cu II	20 6 100 6 3 9 40 25 50 8 3 3 25 15 1 1 1,5 0 80 10 90 7 1000 150 3 12 10 2 5 0 21 5 20 3 10 10 20 11 10 10 10 10 10 10 10 10 1	6150,42 6150,38 6150,303 6149,76 6149,238 6149,23 6147,81 6147,31 6146,45 6146,225 6145,4432 6145,029 6145,0151 6144,97 6143,70 6143,40 6143,0623 6142,508 6142,487 6142,13 6142,487 6142,13 6142,05 6141,79 6140,21 6138,660 6137,697 6136,894 6136,621 6133,220 6131,850 6131,76 6131,43 6129,93 6128,726 6128,4598 6127,49 6127,44	Cu II Cs I Ne I F I Fe II C III C III Fe II Cu I Xe II Ti I Ar I F I Si I Xe I Xe II Ne I Ar II Cl I Cl I Ar II Fe I F I Si I Si I Xe I Ar I Cl I Cl I Ar II Fe I Fr I Si I Si I Xe I TI	20 — 100 800 20 0 0 30 20 50 3 100 8 100 20 4 1 1000 2 100 100 1 1 1 4 25 12 18 4 20 70 90 4 8 8 1 1 1 1 8 8 20 100 0 6 2 15 15 15 20 90 3 3 5 15 100 1 3
6152,55 6152,069 6151,43 6151,38 6151,34 6150,755 6150,54	F I Xe I C II Kr I Cl I N II Kr II	2 20 4 20 2 4 1	6121,008 6120,82 6120,27 6120,102 6119,662 6119,56 6119,23	C I K II Ar II Ar I Kr II N IV	2 8 5 2 10

λ	Symbol	I	λ	Symbol	I
6118,724 6118,027 6117,222 6116,52 6115,85 6115,08 6114,929 6114,86 6114,468 6114,468 6114,468 6114,37 6113,463 6113,15 6112,926 6112,61 6111,759 6111,742 6110,90 6110,81 6109,15 6108,53 6108,37 6108,34 6107,65 6106,605 6106,398 6107,61 6107,45 6106,605 6106,398 6105,97 6105,6354 6104,60 6103,88 6103,86 6103,88 6103,86 6103,611 6103,546 6103,88 6103,611 6103,546 6103,34 6102,765 6102,722 6102,56 6101,925 6101,43 6101,16 6100,46 6100,03 6100,01 6098,92 6098,8046 6098,665	Ar II Ne I F I Cs I C I Kr I Xe II Xe II Cu II Cu II Cl I Ar II Cu II Kr II Cu II	4 15 10 -2 3 50 50 10 20 15 8 1 10 4 40 30 2 5 5 5 2 2 8 3 1 5 10 15 4 5 6 6 6 3 1 5 6 6 6 7 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1	6094,31 6094,30 6093,56 6093,38 6093,33 6092,84 6092,814 6091,92 6091,81 6091,175 6090,902 6090,7865 6088,61 6088,00 6087,80 6086,69 6086,67 6085,86 6085,228 6084,507 6084,11 6083,875 6083,21 6082,8630 6082,53 6081,245 6080,320 6080,113 6080,06 6079,77 6079,71 6079,71 6079,71 6078,40 6078,38 6077,431 6076,738 6077,431 6076,738 6075,24 6074,3377 6073,17 6072,25 6070,83 6067,738 6075,24 6067,738 6075,24 6074,3377 6073,17 6072,25 6070,83 6067,73 6068,25 6067,77 6067,624 6067,52 6067,45	Kr I C I Xe II Xe II Xe I Ar I C I Ti I Si I Kr I F I Ar I F I Kr I Si II C I Ar II F II Ar II F I Ar II F I Ar II F I Ar II C I Ar I C I Ar I C I I C I I C I I C I I I I I I I I I	2 0 300 3 1 1 1 4 15 6 20 6 10 2,5 2 10 0 10 2 20 2 5 2 1 40 4 4 30 100 2 2 2 100 6 2 2 100 100 2 100 100
6098,51 6098,34 6097,59 6097,33 6096,1630 6095,29	C II F I Xe II Cu II Ne I C II	9 25 1000 10 300 7	6066,40 6065,487 6065,00 6064,91 6064,758 6064,631 6064,5359	Al II Fe I N II Xe I Ar I Ti I Ne I	2 15 3 1 6
6095 ,15 6094 ,65 6094 ,50	Xe I Cl II Kr II	1 100 30	6064,5359 6062,09 6061,06 6059,3735	Ne I C I Al II Ar I	50 0 6 100

λ	Symbol	I	λ	Symbol	I
6056 ,36 6056 ,1280 6054 ,18 6052 ,7234	Fe III Kr I Fe III Ar I	9 60 11 30	6022,39 6021,91 6020,179 6019,87	Kr II F I Fe I C I	40 10 10 0
6052 ,19 6051 ,15 6050 ,11	F I Xe II Kr III	1 1000 3	6019,76 6019,71 6019,493	Si II Cl I Ar II	4 6 4
6049,35 6049,072 6048,80	KrI ArII FI	3 6 1 11	6018 ,47 6017 ,70 6017 ,53 6016 ,655	F I N I Ar I Fe I	1 2 1 5
6048,72 6048,53 6048,00 6047,54	Fe III Xe II Xe I F I	5 6 900	6016,655 6016,45 6015,828 6015,40	C I F I N I	6 150 1
6047 ,13 6046 ,894 6046 ,494	Kr II Ar II O I O I	1 8 10	6014,85 6014,10 6014,03	C I Xe I F I	9 1 40
6046 ,438 6046 ,232 6046 ,1348 6046 ,06	O I O I Ne I Kr II	13 12 50 10	6013 ,6790 6013 ,40 6013 ,22 6012 ,41	Ar I Cu II C I K II	6 8 10 1
6045,497 6045,34 6044,79 6044,468	Fe II Ar I C I Ar II	6 1 0 7	6012,24 6012,1570 6010,68	C I Kr I C I	5 50 7
6043,38 6043,2254 6042,46	Xe I Ar I C I	10 100 1	6010 ,4905 6009 ,99 6009 ,78	Cs I Kr II Xe I	50 10 8
6042 ,013 6040 ,7 6039 ,17	Ne I Kr II C I	15 10 0	6008,92 6008,576 6008,48 6008,10	Xe II Fe I N I Kr II	$ \begin{array}{c} 100 \\ 9 \\ 10 \\ 3 \end{array} $
6038,944 6038,1 6038,04 6037,96	F I Kr II F I C II	18 1 80 0	6007,909 6007,18 6006,38	Xe I C I Al II	15 6 10
6037 ,17 6036 ,56 6036 ,20	Kr III Fe III Xe II	10 13 500 15	6006,03 6005,7246 6003,67	C I Ar I C I	9 4 1
6035,82 6034,92 6034,0895 6033,34	Kr I Xe I Cs I F I	2 35 8	6003,170 6003,034 6002,98 6002,19	Ar II Fe I C I Kr I	1 8 4 3
6032 ,59 6032 ,33 6032 ,1291	Fe III Cu I Ar I	7 2 60	6001 ,81 6001 ,78 6001 ,18	Al II F I Al II	8 1
6031 ,36 6030 ,844 6030 ,27 6029 ,9971	Xe I Ar II Si II Ne I	1 1 5 1000	6001 ,13 6000 ,9275 6000 ,104	C I Ne I Cu II	8 100 40
6029,95 6028,220 6027,248	F I Ar II Ar II	20 1 5	5999 ,83 5999 ,753 5999 ,668 5999 ,54	Al II F I Ti I Fe III	2 15 8 5
6026,76 6026,76 6025,1515 6024,77	Xe I Ar I Xe II	4 10 3	5999,47 5999,0004 5999,003	N I Ar I Ti I	6 20 4
6024 ,063 6023 ,25 6022 ,89	Fe I Cu II Xe I	15 10 1	5998 ,3 5998 ,115 5996 ,06	Xe II Xe I C 1	$\begin{matrix}1\\30\\2\end{matrix}$

λ	Symbol	I	λ	Symbol	I
5995,59 5995,28 5994,66 5994,425 5993,8506 5993,27 5993,18 5992,22 5991,93 5991,86 5991,6532 5991,42 5991,383 5991,34	Cu II O I Ar I F I Kr I Cu II O I Kr II O I Xe II Cl I Fe II O I	10 3 2 50 60 8 1 200 2 1 75 4 10 1	5969,056 5968,31 5967,54 5966,59 5966,171 5965,828 5965,4710 5965,28 5965,031 5963,99 5962,4 5962,166 5961,6228	F I Ar I Kr II Cu I Ne I Ti I Ne I F I Ar II C I Fe II F I Ne I	1 1 15 3 35 30 500 70 3 4 30 3 70
5989,40 5989,339 5989,18 5989,03 5988,44 5988,30 5988,288 5988,11	CI Ar II Xe I C I Xe II Cu II Ar II Ar I	1 8 20 2 1 25 3 2 150	5960,901 5959,187 5958,583 5958,386 5958,03 5957,561 5956,87 5955,14 5954,276	N II F I O I O I Xe II Si II F I Kr I N II	4 25 13 12 50 500 2 2 5
5987,9074 5987,3027 5987,055 5986,635 5986,23 5985,920	Ar I Fe I F I Xe I Ar II	40 6 30 4 7	5953 ,820 5953 ,62 5953 ,162 5952 ,388 5952 ,13	Ar II Fe III Ti I N II C I	2 6 30 8 2
5984,94 5984,804 5984,454 5984,393 5984,26 5983,704 5982,67	F I Fe I Ar II Cs C I Fe I C I	1,5 8 3 15 3 6 2	5950,905 5950,147 5950,04 5949,93 5949,2595	Ar II F I C I Kr II Ar I	6 12 1 3 10
5982,401 5982,27 5981,90 5981,22 5979,42 5979,20	Ne I C I Ar I C I Xe I	8 0 5 1 1 3	5948,545 5948,40 5947,61 5945,53 5945,44	Si I Cl I C I Xe II Kr I	200 4 1 300 5
5978, 20 5978, 929 5978, 543 5978, 29 5977, 995 5977, 65 5976, 46	Cu II Si II Ti I Xe I Ar II Kr I	$500 \\ 25 \\ 2 \\ 4 \\ 4$	5944 ,8342 5943 ,89 5943 ,499 5943 ,39 5942 ,6722	Ne I Ar I Mg II C I Ar I	500 2 4 0 40
5975 ,945 5975 ,5340 5974 ,82 5974 ,6273	Xe II Ar II Ne I Kr II Ne I	$ \begin{array}{r} 1000 \\ 2 \\ \hline 600 \\ 2 \\ \hline 500 \\ \end{array} $	5942,13 5941,825 5941,82 5941,755 5941,653	Kr I Ar II Kr II Ti I N II	2 4 4 12 12
5974,152 5973,314 5972,82 5972,59 5972,05 5971,6036	Xe I Ar II Xe I C I Al II Ar I	40 2 1 0 5 5	5941 ,179 5941 ,168 5940 ,86 5940 ,697 5940 ,240	F I Cu II Ar I F I N II	5 50 2 5 8
5971,13 5970,73 5970,41 5969,64 5969,33	Xe II C I Xe I K II C I	200 0 1 2 4	5940,10 5939,319 5938,629 5937,806 5937,59	C I Ne I Mg II Ti I Cu II	0 50 3 6 5

λ	Symbol	ſ	λ	Symbol	ı
5937,56 5936,64 5935,792 5935,03 5935,03	F I Ar II Ar II Kr II Kr III	2,5 1 2 8 8	5911 ,72 5911 ,55 5909 ,67 5908 ,22 5907 ,83	Kr II Ti I Xe II CI I Ti I	10 3 30 2 4
5934 ,55 5934 ,458 [.] 5934 ,172 5934 ,00 5933 ,958	Xe II Ne I Xe I Cl I Ne I	2 75 100 1 8	5907,21 5906,76 5906,4294 5906,35 5905,13	C II Xe I Ne I Ti I Xe II	6 3 50 5 200
5931 ,779 5931 ,39 5931 ,241 5930 ,35 5930 ,186	N II F I Xe I Cl I Fe I	11 6 80 6 8	5904,462 5904,35 5904,291 5903,6 5903,317	Xe l Ti l Ar II Fe II Ti I	20 4 2 8 5
5929,69 5929,27 5928,8124 5928,233 5927,811 5927,60	Fe III Ti I Ar I Mg II N II F I	18 3 200 4 9	5903,06 5902,783 5902,4623 5902,097 5901,21 5900,89	F I Ne I Ne I Ne I Cu II Kr II	0,8 5 50 3 5 8
5927, 60 5927, 13 5926, 90 5925, 651 5925, 56	Ar I Cu Il Cs II Xe I Ti I	10 3 60 6	5900,80 5899,83 5899,295 5898,788 5898,56	Ti I N II Ti I Si III Xe I	4 1 25 10 8
5923,69 5923,366 5922,72 5922,709 5922,550	Ca II Mg II Ca II Ne I Xe I	1 3 1 25 20	5898,406 5897,986 5897,25 5895,9236 5895,62	Ne I Cu II N II Na I Xe I	20 25 2 16 2
5922 ,33 5922 ,112 5921 ,85 5921 ,50 5920 ,13	Cl II Ti I Xe I Xe II Fe III	7 18 10 2 7	5894,988 5894,56 5894,07 5893,29	Xe I Kr II C III Xe II	100 8 3 150
5919,45 5919,06 5919,037 5918,9068 5918,81	C II Ti I Ne I Ne I Kr II	$\begin{array}{c} 3 \\ 10 \\ 8 \\ 250 \\ 2 \end{array}$	5893,15 5892,00 5891,91 5891,74 5891,72	N II C I Fe III F I Kr III	3 1 6 8 5
5918 ,548 5918 ,158 5917 ,44 5916 ,65	Ti I Mg II Xe II Xe I Ar I	10 6 50 4 5	5891,59 5891,36 5889,96 5889,9504 5889,77	C II Fe II Ti I Na I C II	12 8 8 32 15
5916,429 5916,48 5915,220 5915,123	Mg II Ti I Si II Ti I	7 5 150 9	5889,52 5889,27 5889,12 5889,05	C I C II Xe I Ti I	2 6 20 3 300
5914 ,93 5914 ,64 5914 ,162 5913 ,6327 5912 ,80	Ti I C II Fe I Ne I Xe II	5 4 8 250 5	5888,5851 5887,68 5886,088 5885,05 5882,6250	Kr I Ar II Ti I Ar I	3 3 100
5912 ,58 5912 ,0861 5911 ,90	C I Ar I Xe I	500 5	5881 ,8950 5881 ,18 5880 ,54		1000 2 1

			1		1
λ	Symbol	I	λ	Symbol	I
5880,306 5879,9000 5878,92 5877,31 5875,966 5875,624 5875,018 5874,42 5873,764 5873,50 5872,8275 5872,36 5872,149 5871,69 5871,18 5870,971 5870,9153 5870,443 5870,46 5870,443 5870,26 5869,23 5868,4183 5868,4183 5868,757 5867,483 5867,572 5867,483 5867,572 5867,483 5866,7514 5866,75 5866,598 5866,7514 5866,75 5866,598 5866,453 5866,453 5866,75 5866,32 5864,95 5863,24 5863,24 5863,24 5863,24 5863,31 5860,75 5860,3118 5859,71 5859,47 5858,63 5858,63 5858,63	Ti I Kr I Xe I C I IIe I IIe I Ti I Si I Kr III Ne I Ti I Ne I C III Ti I Ar I Ti I Ar II Ti I Ca I Si II Kr II Ca I Si II Kr II Ca I CI I Ar II Ti I CI I CI I I CI III I I I I I I I I I	5 50 60 2 1000 7500 100 3 40 1 500 10 75 2 6 3 3000 3 4 2 3 75 300 3 1 1 10 50 4 2 3 75 3 10 5 6 6 7 5 6 7 6 7 7 8 8 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1	5851,93 5851,1 5850,25 5849,85 5849,66 5847,68 5847,64 5847,12 5846,70 5846,69 5846,35 5846,21 5846,35 5846,21 5843,46 5843,46 5843,74 5843,74 5843,61 5843,43 5842,67 5842,49 5841,44 5841,01 5840,83 5840,048 5839,85 5839,820 5839,73 5838,96 5838,8347 5838,96 5838,8347 5838,03 5838,01 5837,34 5836,35 5835,5 5834,71 5834,2660 5833,93 5833,68 5832,8600	Cu II Cu I	2 2 3 3 7 10 8 2 0 2 5 1 4 2 4 1 4 2 4 1 4 4 1 6 4 5 1 6 6 1 6 6 6 7 6 6 7 6 7 7 8 7 8 7 8 7 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8
5857,454 5857,32 5856,94 5856,70 5856,509 5856,23	Ca I Kr I Cu I Cl I Xe I N I	100 1 5 8 15 1	5831 ,887 5831 ,159 5830 ,63 5830 ,04 5829 ,86	K I Cs II Xe I Ar IV Ti I	$ \begin{array}{r} 17 \\ 60 \\ 20 \\ \hline 5 \end{array} $
5856,04 5855,47 5854,16 5854,04 5853,62 5853,10	C II Xe II N I Kr II Al II Ar II	5 1 2 4 5 2	5829,53 5828,91 5828,059 5827,85 5827,801 5827,72 5827,48	N I Ne I Ar II C II Si II Xe I F I	6 75 3 2 30 1 0,6
5853,06 5852,86 5852,4878	F I Kr I Ne l	$\begin{array}{c} 2,5 \\ 5 \\ 2000 \end{array}$	5827,28 5827,07 5826,44	Ti I Kr I N IV	20

λ	Symbol	ſ	λ	Symbol	I
5826 ,42 5826 ,24 5826 ,036 5826 ,02 5824 ,800	C III Cl I Ar II Cu II Xe I	I 2 2 40 150	5800,468 5800,46 5800,23 5800,16 5799,88	Si II Ar II C I Kr II Cl I	150 1 3 6 12
5824,64 5824,50 5823,890 5823,679 5823,51	C I Kr I Xe I Ti I Kr I	1 40 300 3 3	5799,734 5798,90 5798,44 5797,8591 5796,26	Ar II C I Ti I Si I Cl I	3 0 4 100 15
5823,14 5822,114 5821,57 5820,52 5820,1558	C II Ar II Xe II Xe I Ne I	$\begin{array}{c} 2\\ 3\\ 4\\ 25\\ 500 \end{array}$	5795,08 5794,90 5794,46 5793,51 5793,12	N IV Si II C I N I C I	30 3 4 7
5820,10 5819,96 5819,50 5818,30 5817,88	Kr I Ti I C I C II Ti I	15 8 1 2 6	5793,0714 5792,26 5791,98 5791,77 5791,26	Si I Xe I Xe II C II Ti I	90 1 1 1 7
5817,70 5816,86 5816,645 5816,48 5816,272	C I Ti I Ne I N I Ar II	$\begin{array}{c} 0 \\ 6 \\ 50 \\ 2 \\ 2 \end{array}$	5790,50 5790,39 5789,477 5788,24	CI II Ar I Ar I Kr I Ti I	25 5 20 7
5815,96 5814,505 5814,181 5813,51 5812,746	Xe II Xe I Cs II C I Ar II	50 60 25 1 6	5788,08 5787,29 5786,560 5785,979 5785,73	Kr I Ar II Ti I Si II	5 6 5 5 30
5812,400 5812,30 5812,148 5811,98 5811,4066	Ne I N IV K I C IV Ne I	$\frac{15}{15}$ $\frac{9}{300}$	5785 ,66 5785 ,560 5785 ,45 5785 ,312 5784 ,38	Ti I Mg I F I Mg 1 Ti I	$25\ 4\ 0,5$ $5\ 3$
5810,80 5810,187 5810,08 5809,5	Kr I Si III Ti I Xe II	8 3 3 4 1	5783,89 5783,68 5783,541 5782,384	Kr ! Ti I Ar I K I	10 3 40 16
5807,596 5807,314 5807,23 5806,76 5806,738	Ar II Xe I Ti I Cl I Si II	$\begin{array}{c} 15 \\ 8 \\ 2 \\ 200 \end{array}$	5782,432 5781,268 5780,70 5780,55 5780,3839	Cu I Ar II Ti I Xe III Si I	1500 2 12 2 70
5806,00 5805,80 5805,53 5805,19	Cu II C I Kr I C I Ne I	25 3 20 4 500	5760,3635 5777,72 5776,96 5776,39 5776,374	Kr II Ti I Xe II Ar II	$\begin{array}{c} 2 \\ 3 \\ 100 \\ 2 \end{array}$
5804,4496 5804,265 5804,098 5802,84 5802,0809	Ti I Ne I Cl I Ar I	5 75 5 40	5775,56 5774,72 5774,697 5774,54 5774,037	Kr I Cl I Ar II Ti I Ti I	2 4 1 13 5
5801,81 5801,752 5801,33 5801,47 5800,59	Kr II K I C IV Kr I C I	1 17 10 2 6	5774,00 5773,5 5772,58 5772,326 5772,32	Ar I Kr II Cl I Ar II K II	40 1 5 5 4

λ	Symbol	I	λ	Symbol	1
5772 ,1453 5772 ,1160 5771 ,66 5771 ,41	Si I Ar I C III Kr II Ti I	70 100 2 100	5745 ,7244 5745 ,07 5744 ,47 5743 ,28	Cs I Ti I Ti I Ca I	 8 5 3 2
5771 ,28 5770 ,307 5768 ,30 5767 ,440 5766 ,542	Ne I Cl I N II Ar II	$\begin{array}{c} 6 \\ 50 \\ 2 \\ 7 \\ 2 \end{array} \Big $	5743 ,278 5740 ,73 5740 ,65 5740 ,17	Ar II Xe I N I Xe I	1 2 6
5766 ,330 5765 ,55 5764 ,4188 5764 ,32	Ti I Cl I Ne I Ca I	$\begin{bmatrix} 4 \\ 3 \\ 700 \\ 3 \end{bmatrix}$	5739 ,975 5739 ,88 5739 ,733 5739 ,5207 5739 ,464	Ti I Ar IV Si III Ar I Ti I	
5764,063 5763,52 5763,013 5762,9769 5762,90	Ne I Ti l Fe I Si I Kr I	$egin{array}{c} 3 \\ 3 \\ 10 \\ 45 \\ 4 \end{array}$	5738,416 5737,96 5736,94 5735,77 5735,74	Ar I Ar I N IV Ti I Ca I	$ \begin{array}{r} 20 \\ 5 \\ \hline 3 \\ 3 \end{array} $
5762 ,295	Ti I	4	5735,63	N I	1
5761 ,96	Xe III	2	5734,95	Ti I	3
5761 ,88	Ca I	1	5734,39	F I	3
5761 ,37	Cu II	2	5734,24	Ti I	10
5760, 5885	Ne I	70	5733 ,48	Xe I	$egin{array}{c} 4 \\ 1 \\ 75 \\ 1 \end{array}$
5759, 43	Cu II	5	5732 ,694	Ar II	
5758, 84	Ar I	5	5732 ,325	Cu I	
5758, 65	Xe II	100	5732 ,210	Ar II	
5757,69	Ca I	4	5731 ,70	Ca I	1
5756,600	Ar II	3	5731 ,403	O I	3
5756,45	Ti I	6	5731 ,08	Ti I	4
5755,60	Kr II	2	5730 ,86	Kr I	4
5755,04 5754,60 5754,33 5754,2195 5754,18	Kr I Xe I Kr I Si I Xe II	2 1 1 45 2	5730 ,65 5730 ,51 5728 ,25 5727 ,96	N II Ti I Ti I Cu I	5 3 4 5
5753 ,625	Si I	45	5726,91	Xe II	200
5753 ,54	Ar II	1	5726,59	Kr I	20
5753 ,136	Fe I	5	5726,16	Cl I	5
5752 ,98	Kr II	60	5726,10	Xe I	4
5752,64	N I	10 4 3	5724,325	Ar II	5
5752,56	Xe II		5723,56	Kr I	15
5751,74	Ti I		5723,26	Xe I	1
5751,05	Ti I		5722,65	Al III	6
5751,03	Xe II	200	5722,59	F I	6
5750,57	Kr I	10	5722,14	Xe I	15
5750,424	O I	5	5721,88	Kr I	10
5749,27	Kr II	5	5721,80	Ti I	4
5749,02	Kr I	5	5721,78	Cu II	20
5748 ,71	Xe III	12	5720 ,78	C I	2
5748 ,650	Ne I	70	5720 ,613	O I	1
5748 ,2985	Ne I	500	5720 ,445	Ti I	3
5748 ,20	Xe I	8	5719 ,532	Ne I	75
5747 ,6670	Si I	45	5719 ,2248	Ne I	500
5747,36	N I	2	5719,16	F I	1 ,5
5747,296	N II	8	5718,899	Ne I	150
5747,18	Ar I	2	5717,99	Ca I	4
5746,88	Xe II	5	5717,61	Kr I	3
5746,81	Ca I	2	5716,450	Ti I	4

λ	Symbol	I	λ	Symbol	1
5716 ,289 5716 ,252	Si III Xe I	8 80	5696 ,479 5696 ,47	Xe I Al III	80
5716 ,19 5716 ,029 5715 ,80	Xe II Ar II Kr III	100 1 1	5695 ,92 5695 ,750 5695 ,522	C III Xe I Si III	$\begin{array}{c} 12\\100\\3\end{array}$
5715 ,716 5715 ,339 5715 ,123	Xe I Ne I Ti I	70 35 9	5694,30 5693,11	C II C I Ar I	2 3 1
5714 ,11 5713 ,895	Kr I Ti I C II	$\frac{2}{3}$	5693,10 5692,53 5692,41	Ti I Cu II Kr II	3 2 5
5713 ,56 5712 ,51 5712 ,48	C II Ar I	1 1 2	5692 ,11 5691 ,650 5690 ,4251	Ar II Si I	8 100
5712 ,21 5711 ,852 5711 ,453	Xe I Ti I Ar II	4 1	5690 ,35 5689 ,91 5689 ,86	Kr II Ar I Cu II	$ \begin{array}{c} 200 \\ 200 \\ \hline 5 \\ \hline \end{array} $
5711 ,0880 5710 ,766 5710 ,68	Mg I N II Ti I	30 10 3	5689 ,8163 5689 ,64 5689 ,465	Ne I Ar I Ti I	150 200 10
5709 ,95 5709 ,80 5709 ,3864	Ti I Xe I Fe I	3 10 10	5689 ,14 5688 ,811 5688 ,47	F I Si II Ca I	18 300 4
5709 ,33 5708 ,616 5708 ,397	Ti I Ar II Si I	$\begin{array}{c} 4\\1\\160\end{array}$	5688 ,373 5688 ,2046	Xe I Na I	$\frac{40}{9}$
5708 ,199 5708 ,03 5707 ,62	Ti I C II F I	$\begin{array}{c} 3 \\ 0 \\ 2 \end{array}$	5688,1934 5687,52 5687,40	Na I Ti I Ar I	$\begin{array}{c} 1\\4\\20\end{array}$
5707 ,5188 5707 ,31	Kr I F I	40 25	5686 ,49 5686 ,28 5686 ,213	Xe II Cl I N II	$egin{array}{c} 2 \\ 1 \\ 10 \end{array}$
5707 ,215 5707 ,03 5706 ,87	Ar II Ca I Xe I Ti I	$egin{array}{c} 1 \\ 1 \\ 3 \\ 5 \end{array}$	5685 ,74 5684 ,647	F I Ne I	8 25
5706 ,85 5706 ,370 5705 ,43	Si II Ti I	100 4	5684,4843 5683,80 5683,73	Si I Ti l Ar I Ca I	$\begin{array}{c} 120 \\ 3 \\ 40 \\ 3 \end{array}$
5704,598 5704,371 5703,34	Si III Ar II Xe I	7 3 1	5682,88 5682,6333 5682,42	Na I Cu II	$\frac{5}{5}$
5703 ,121 5702 ,666 5702 ,19	Si III Ti I Kr I	4 6 10	5681 ,9014 5681 ,89 5681 ,87	Ar I Kr II Xe II	$\begin{array}{c} 500 \\ 400 \\ 1 \end{array}$
5702 ,11 5701 ,66 5701 ,551	Ti I Ti I Fe I	$\begin{matrix} 6\\7\\7\end{matrix}$	5681 ,480 5681 ,44	Ar II Si II Ti I	$\begin{array}{c}2\\30\\6\end{array}$
5701 ,374 5701 ,31 5701 ,16	Si II Xe III C II	$\begin{array}{c} 200 \\ 6 \\ 2 \end{array}$	5681,08 5679,562 5676,019 5675,418	N II N II Si I	14 11 20
5701,10 5701,1048 5700,874	Si I Ar I	90 60	5675 ,413 5675 ,15	Ti I Xe II	9 1
5700,82 5700,240 5699,84	F I Cu I Kr II	$\begin{array}{c} 25 \\ 1500 \\ 10 \\ \end{array}$	5674,73 5674,52 5674,39	Ar I Kr II F I	$\begin{matrix} 1\\30\\8\end{matrix}$
5699,64 5698,54	Xe II Xe I Kr I	100 8 1	5673 ,45 5672 ,952 5672 ,78	Ti I Ar II Kr II	10 7 40
5696 ,95 5696 ,54 5696 ,50	Kr I Si III	$\frac{1}{3}$	5672 ,4519 5671 ,668	Kr I F I	50 90

λ	Symbol	I	λ	Symbol	I
5670,96 5669,8 5669,76 5669,743 5669,562 5668,96 5667,56 5667,532 5667,40 5666,627 5666,627 5666,46 5666,09 5665,82 5665,5536 5664,485 5664,47 5664,46 5664,02 5664,46 5664,02 5664,46 5662,891 5662,891 5662,5489 5662,525 5662,47 5662,154	Xe II Na I Ti I Si I Si II C I Xe II F I Ar I N I Si I N II Xe III Kr I Ar J Si I Kr II Cu II Xe II Xe II Ti I Kr I Ne I Fe I C II Ti I	50 3 5 40 1000 7 300 40 1 1 1 10 12 1 1 5 80 1 3 1 3 15 4 3 75 6 12 12	5648,07 5646,5 5646,254 5646,19 5645,960 5645,960 5645,00 5644,137 5642,73 5642,413 5641,30 5641,07 5640,55 5639,478 5639,478 5639,478 5638,52 5637,29 5636,67 5635,882 5635,575 5635,575 5635,575 5635,575 5634,84 5634,73 5634,84 5634,73 5634,661 5633,24 5633,14	C II Cu I F I Xe I Si I Kr II Ti I K II Ar II Cu II Kr II C II Si II Ar I Cu II C	10 2 8 5 90 1 18 5 2 60 20 3 8 200 100 12 20 —————————————————————————
5662, 154 5662, 00 5661, 106 5660, 683 5660, 656 5660, 502 5659, 38 5659, 15 5659, 1278 5659, 104 5658, 8247 5656, 6588 5656, 51 5656, 09 5656, 030 5655, 236 5654, 924 5654, 78 5654, 450 5654, 31 5654, 20 5654, 31 5654, 20 5652, 5664 5650, 7054 5650, 7054 5650, 37 5649, 5625 5648, 66 5648, 570	Til Ar I F I Si I Si II Si I Xe II F I Ar J Ti I Ne I Ti I Ne I Ar II Si I Ti I Ar II Xe I Cl I Ar II Xe I Ar II Xe I Ar II Xe I Ti I Ti I	12 5 7 13 150 10 150 15 500 3 10 500 4 4 75 2 15 8 8 4 1 2 2 0,5 75 15 15 10 10 10 10 10 10 10 10 10 10	5633,02 5632,973 5631,72 5631,381 5631,160 5630,44 5630,29 5629,93 5627,45 5627,02 5626,93 5625,684 5625,43 5624,78 5624,5501 5624,06 5624,005 5623,778 5623,58 5623,20 5622,2214 5621,24 5620,89 5620,72 5620,636 5619,00 5618,878 5618,32	Kr II Si II N II Ar II Ar II Ti I C I Ti 1 Kr II F I Ar II N 1 Xe II Fe I F I Ar II Ar I CI I I I I I I I I I I I I I I I I I	100 100 1 1 3 10 6 1 3 1 12 6 2 1 10 20 4 30 15 4 30 15 1 60 1 2 8 8 8 9 5 8 8 8 8 8 8 8 8 8 8 8 8 8

_			1			<u> </u>
_	λ	Symbol	I	λ	Symbol	I
	5618,010 5617,63 5616,67 5616,54 5616,49 5615,65 5615,20 5614,81 5613,19 5612,89 5612,65 5611,36 5611,36 5611,36 5611,35 5609,578 5608,90 5608,37 5607,99 5607,72 5607,66 5607,51 5606,7341 5605,25 5604,36 5604,28 5604,11 5603,932 5603,73 5602,9529 5602,875 5602,875 5602,846 5602 5601,85 5601,461 5601,285 5601,461 5601,285 5601,08 5600,54 5600,43 5599,246 5598,50 5598,487 5597,90	Ar I Kr II Xe II N I C I Fe I Cu II C I Al II Xe II Xe I Kr I Ar II Ar I Ar I Kr I Xe I Kr I F I O V Ar I Si II C I Fe I Si I C I Fe I Si II C I Fe I Si II C I Fe I Si III C I Fe I Si III C I Fe I C I C I C I C I C I C I C I C I C I C	60 2 150 50 50 50 50 50 50 3 1 15 4 2 2 2 20 3 3 1 0 ,5 - 500 3 500 0 3 500 0 1 1 2 2 2 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	5591,61 5591,41 5591,45 5590,420 5589,378 5589,31 5588,757 5588,7213 5587,888 5586,7634 5585,905 5585,4 5583,5 5583,29 5582,61 5581,971 5581,93 5581,83 5581,83 5581,784 5580,45 5580,3890 5579,93 5579,93 5579,033 5579,93 5579,64 5577,689 5577,689 5577,64 5577,689 5577,64 5577,33 5576,661 5576,049 5576,049 5575,973 5575,6 5575,27 5574,20 5573,6740 5573,13 5572,8501	Xe II Kr I Ne I Ca I Ne I F II Ca I Ar I F I Fe I Ne I Kr II Xe II Ca I Xe II Ar II Xe II Ca I Xe II Ar I Xe I Ch I Ar II F I Si II F I Si II F I Si II Kr I Cs I Kr I F I F I F I F I F I F I F I F I F I F	2 2 8 20 50 0 80 500 40 5 1 1 1 2 1 25 2 60 50 3 80 - 40 2 6 3 80 - 40 2 6 3 1 1 1 2 5 1 2 6 6 1 1 1 1 1 2 6 6 7 8 8 9 1 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	5597,69 5597,4783 5597,32 5597,30 5594,87	Ti I Ar I Kr III C I Xe II	3 500 5 1 4	5572,5428 5572,19 5572,00 5570,2890 5570,216	Ar I Xe II O V Kr I F I	500 50 — 2000 2,5
	5594,468 5594,37 5593,73 5593,52 5593,23	Ca I Xe I Cu II Ar II Al II O III	60 6 5 1 10 6	5569 ,6256 5568 ,81 5568 ,65 5568 ,4078 5567 ,815	Fe I Cl II Kr II Cs I Fe II	20 15 100 — 10
	5592,37 5592,200 5592,01 5591,75 5591,734	Ar II O III Ar I F I	5 1	5567 ,77 5567 ,63 5566 ,7 5566 ,615 5566 ,22	Xe I N I Cs Xe I Xe I	2 1 40 100 5

λ	Symbol	I	λ	Symbol	I
5566,02 5565,96 5565,478 5565,25	Xe III Ar I Ti I N II	2 5 9 3	5543 ,471 5542 ,73 5542 ,10	N II Ar I Kr I	5 2 1
5564,37 5563,84	N I N I	9 3	5541 ,65 5541 ,46 5540 ,90	Kr II Ar I Ar I	4 2 40
5563,604 5563,50 5563,196	Fe I Xe I Ar II	5 2 2	5540,76 5540,74 5540,52	C I Si II F I	2 100 18
5563 ,047 5563 ,019 5562 ,7662 5562 ,441	Ne I Cs II Ne I Ne I	75 125 500 150	5540 ,38 5540 ,36 5540 ,059 5539 ,926	Xe I N I N II Si III	3 1 4 3
5562,2254 5560,37 5560,22 5559,62	Kr I N I Ar I Ar I	500 9 10 200	5539 ,4 5539 ,33 5538 ,651 5538 ,61 5537 ,61	Kr I F I Ne I F I C II	$\begin{array}{c} 1 \\ 6 \\ 50 \\ 0, 5 \\ 3 \end{array}$
5559 ,26 5559 ,087 5558 ,7031	Kr I Ne I Ar I	2 35 500	5537 ,290 5536 ,01 5535 ,78	Ar II K II Cu I	5 3 50
5557 ,948 5557 ,44 5557 ,28 5557 ,063	Al I N I Xe I Al I	$egin{array}{c} 8 \\ 2 \\ 2 \\ 10 \end{array}$	5535,51 5535,39 5535,37	Ar II Cl II N I	1 5
5555,06 5555,003 5554,99 5554,935	Xe I O I Xe II Cu I	1 9 3 100	5535,363 5535,363 5534,98 5534,81	N II C II Cu II C I	1 8 5 3 1
5554,887 5554,832 5554,050 5553,53	Fe I O I Ar II F I	5 8 8 0,7	5534,862 5534,45 5533,6788 5532,78	F I Ar I Ne I Xe I	2 60 75 2 5
5553,40 5553,17 5553,10	Ar I C I Xe I	2 1 3	5532 ,29 5532 ,13 5532 ,0	Kr II Cl I Na I	${8\atop 2}$
5552 ,99 5552 ,83 5552 ,76 5552 ,67	Kr II Xe III Ar I N II	100 12 10	5531 ,07 5530 ,244 5529 ,78	Xe II N II C I	400 7 1
5552,43 5552,385 5551,922 5551,59 5551,50	F I Xe I N II C I Xe II	4 12 80 5 5	5528,93 5528,63 5528,4047 5526,84 5526,239	Ar I Kr I Mg I C I N II	$\begin{array}{c} 40 \\ 2 \\ 40 \\ 2 \\ 5 \end{array}$
5551 ,03 5548 ,90 5548 ,24 5547 ,27 5546 ,74	C I C I C I	2 1 0 3	5525 ,856 5525 ,59 5524 ,9598 5524 ,39 5523 ,70	Ar II Xe II Ar I Xe III Ar I	$\begin{array}{c} 2 \\ 50 \\ 300 \\ 40 \\ 5 \end{array}$
5546 ,11 5545 ,11 5545 ,07 5545 ,045	FI KrII NI CI ArII	0,7 5 3 6 6	5523 ,690 5523 ,47 5523 ,05 5522 ,94 5521 ,74	Ar II Kr II Xe I Kr II Ar II	$\begin{array}{c} 2\\ 30\\ 3\\ 60\\ 1 \end{array}$
5544 ,4 5543 ,880 5543 ,82	Kr I Ar II C I	1 0	5521 ,17 5520 ,63 5520 ,52	Kr I Ne I Kr I	$\begin{array}{c} 3\\3\\40\end{array}$

		 			
λ	Symbol	I	λ	Symbol	I
5519,337 5518,56 5518,20 5517,535 5516,668 5516,66 5514,536 5514,367 5514,350 5512,979 5512,97 5512,69 5512,69 5512,69 5512,69 5511,485 5511,46 5510,55 5509,597 5509,20 5509,46 5507,47 5506,7824 5506,7824 5506,1149 5506,7824 5504,917 5504,34 5504,917 5504,88 5502,8843 5502,8843	Ar II Xe II Ar I Si I Ar II C I Ti I Ar II Ti I Ar II Ca I Cl I O I K II Ne I Kr I Xe III Ar II Xe II Ar II	$\begin{array}{c} 4\\ 1\\ 5\\ 3\\ 2\\ 20\\ 0\\ 25\\ 4\\ 20\\ 1\\ 20\\ 4\\ 8\\ 2\\ 7\\ 5\\ 15\\ 3\\ 1\\ 1\\ 2\\ 2\\ 1\\ 4\\ 10\\ 2\\ 25\\ 15\\ 18\\ 8\\ -\\ 3\\$	5493,23 5493,14 5492,8 5492,77 5492,43 5492,06 5491,43 5490,33 5490,94 5490,16 5490,151 5490,122 5490,114 5488,95 5488,86 5488,555 5488,46 5487,46 5487,138 5487,03 5486,6 5487,46 5487,46 5487,46 5487,46 5487,138 5487,03 5486,6 5487,46 5487,46 5487,46 5487,46 5487,138 5487,03 5486,6 5487,46 5487,46 5487,46 5487,138 5487,03 5486,6 5487,46 5487,46 5487,46 5487,46 5487,53 5486,6 5486,47 5486,102	Si I N II Cl I O I Kr I Ti IV Ar I Kr II Kr I Kr I Ar II C II Ti I Ar I Si III C II Kr I Xe I Ar I Ti I Kr I C II Ti I Kr I Ti I Xe I Ar II Xe I	40 1 3 3 1 6 40 4 2 50 1 1 1 2 60 3 1 5 20 2 1 8 6 3 2 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1
5502 ,8843 5502 ,88 5501 ,480 5501 ,4686 5501 ,43 5500 ,71	Cs I Al II Ar II Fe I Kr III Kr I	2 12 10 50	5481,33 5480,062 5479,12 5478,73		1 7 1 5
5501,4686 5501,43 5500,71 5500,334 5499,54	Fe I Kr III Kr I Ar II Kr II	12 10 50 7	5480,062 5479,12 5478,73 5478,59 5478,096 5477,695	N II Xe I Si II C II N II Ti I	7 1 5
5499 ,00 5498 ,972 5498 ,185 5497 ,5196 5497 ,123	Ar I Ar II Ar II Fe I Ar II	10 2 8 15	5477,66 5476,58 5476,571 5476,46 5475,49 5475,49	Kr III Kr I Fe I Kr II Kr II Kr III	10 4 1 1
5496 ,45 5496 ,21 5495 ,876 5495 ,666	Si II Kr I Ar I N II	200 3 1000 10	5475,29 5474,228 5473,920 5473,7	N II Ti I Fe I O V Ti II	4 6 5 - 1
5495 ,07 5494 ,4158 5493 ,49	Xe II Ne I Ar I	20 50 20	5473 ,517 5473 ,455 5473 ,045	Ar I Si III	500 7

λ	Symbol	1	λ	Symbol	I
5472,642 5472,61 5471,198 5470,307 5470,13 5469,65 5469,63 5469,58 5469,450 5469,105 5468,17 5467,1626 5466,94 5466,868 5466,440 5466,432 5465,9443 5464,136 5463,283 5463,138 5462,65 5462,592 5462,146 5461,9231 5461,37 5460,502 5460,39 5460,037	Symbol Ar II Xe II Ti I Ar II K II Ar I Cu II Xe II Si II Ar II Fe II Si II Cs I Mg II Fe I Cu I Kr I N II Si II Cs I Kr I Xe I Xe II Xe II	1 500 5 2 6 20 3 20 30 100 6 200 60 20 500 5 500 5 2 10 150 2 7 10 - 1 4 300 15	5451,259 5450,90 5450,45 5450,05 5449,61 5448,61 5448,509 5447,556 5447,26 5447,120 5446,920 5446,34 5445,52 5445,43 5445,037 5444,99 5444,87 5444,25 5443,88 5443,681 5443,42 5443,21 5442,22 5440,932 5440,932 5440,932 5439,990 5439,990 5439,990 5439,983	Mg II Xe II F I Kr II Ar I Ne I Kr II Si II Ne I Fe I Kr II Xe II I I I I I I I I I I I I I I I I I I	1 20 100 1 1 2 10 150 3 2 20 8 40 80 150 1 1 15 10 1 160 20 5 100 150 20 5 100 150 3 1 100 150 150 150 150 150 150 150 150 1
5460,019 5459,61 5459,47 5458,80 5457,75 5457,47 5457,4158 5457,02 5456,45 5456,45 5456,39 5456,39 5456,27 5456,01 5455,6131 5454,54 5454,30 5454,30 5454,30 5454,221 5453,634 5452,5 5452,083 5451,6539 5451,462	Mg II Ar I Kr I Kr I Ar I CI II Ar I CI II Si II Xe I Ar II Fe I Xe I Si II Ar II Ar II Ti I Ar II O IV N II Ti II Si III Ar I Si III Ar I Si III	$ \begin{array}{c} 1\\20\\4\\7\\10\\30\\200\\75\\100\\2\\5\\50\\5\\40\\1\\1\\7\\3\\5\\-\\7\\1\\4\\500\\6\end{array} $	5438,96 5438,63 5438,62 5438,20 5437,36 5436,861 5435,83 5435,775 5435,60 5434,526 5434,039 5433,48 5432,94 5432,94 5432,89 5432,05 5431,77 5431,5 5430,27 5429,699 5429,69 5429,69 5429,69 5429,69 5429,69 5428,92 5428,07	Xe I O I S Fe I Mg II Ne I Ar I Kr II Ar II Si II Ar I Cu I Kr I O V Ar I 9 Fe I Ar I	400 400 400 1000 2 2 111 1 10 5 9 30 4 250 1 15 1 15 10 40 20 6 15 2

λ	Symbol	I	λ	Symbol	I
5427,832 5427,39 5426,5 5426,256	Fe II Ar I O IV Ti I	$\frac{30}{\frac{1}{3}}$	5405 ,34 5404 ,87 5404 ,148 5403 ,03 5402 ,793	Si II O I Fe I Kr I Cs	100 3 30 2 40
5424 ,36 5424 ,076 5423 ,56 5423 ,52 5423 ,25	Cl II Fe I Kr II Cl II Cl II	25 45 1 100 150	5402,604 5402,170 5401,543 5401,450	Ar II Ar II Mg II N I	8 1 9 4
5422 ,55 5422 ,47 5421 ,76 5421 ,61 5421 ,3536	Ar I Ti II Xe I Si I Ar I	2 1 2 10 500	5401,04 5400,62 5400,5616 5400,503 5400,45	Xe III Ar II Ne I Fe I Xe I	50 1 2000 5 4
5421 ,168 5420 ,155 5419 ,687 5419 ,15 5418 ,5584	Si I Ne I Cs II Xe II Ne I	10 50 60 2000 150	5399,01 5398,82 5397,718 5397,63 5397,522 5397,131	Ar I Ti IV F I Xe I Ar II Fe I	20 8 1 1 9 40
5418,43 5418,2 5418,02 5417,4 5417,24	Kr II Xe II Xe I O V Si II	$ \begin{array}{c} 30 \\ 2 \\ 5 \\ \hline 45 \end{array} $	5397,093 5396,30 5394,81 5394,738	Ti I Ti II Ar II Xe I	4 1 1 20
5417,22 5416,710 5415,64 5415,36 5415,207	Ar II Si II Xe II Fe I	10 1 5 50 35	5393 ,971 5393 ,96 5393 ,603 5393 ,18 5393 ,175	Ar I Cu II Ar II Si II Fe I	200 3 5 3
5414,42 5414,28 5414,20 5413,6145	Kr I Cs I Cl II Cs I	1 - 2 -	5392,795 5392,12 5391,62 5390,72	Xe I Cl II Cu I Ar I	100 100 450 40
5413,56 5413,32 5412,900 5412,649 5412,434 5412,19	Xe III Ar I F I Ne I Ar II Kr III	$\begin{array}{c} 12 \\ 10 \\ 0, 6 \\ 250 \\ 2 \\ 5 \end{array}$	5390,68 5390,45 5389,996 5389,12 5389,10	N II Cu II Ti I Kr III Ar I	1 5 3 1 40
5411,881 5411,646 5411,524 5410,909	N I Ar II He II Fe I O I	2 5 3 50 15 4	5388 ,48 5387 ,37 5386 ,79 5386 ,519 5385 ,88	Al II Ar I Ar I Ar II F I	1 40 1 2 0,6
5410,76 5410,4750 5410,15 5410,12 5410	Ar I F I Ne I O VI	$ \begin{array}{r} 4 \\ 500 \\ 4 \\ \hline 6 \end{array} $	5384,378 5384,17 5383,71 5383,371	Ar II Xe III N II Fe I Ne I	5 2 2 35 25
5409 ,609 5409 ,44 5409 ,401 5409 ,34 5408 ,87	Ti I Kr I Ar II Ar I O I	1 1 1 3	5383 ,250 5382 ,330 5381 ,39 5381 ,03 5381 ,020	Ar II Kr III F I Ti II	2 2 0,8 1
5408,59 5408,34 5407,35 5407,348	O I Cu I Cs II Ar II	100 2 7	5380 ,48 5380 ,34 5379 ,64 5379 ,163	Si II C I Kr I Ar II	5 10 15 1
5406 ,6672 5405 ,7781	Cs I Fe I	40	5378 ,45 5378 ,078	N I Ar II	0 3 68

λ	Symbol	I	λ	Symbol	I
5376 ,867	Cu I	5	5357,33	Cu I	3
5376 ,85 5376 ,636	Cu II Ar II	$\frac{3}{3}$	5356,80	Xe I	1
5376,0	o v	_	5356,77 5356,49	N I Ar I	5 10
5374,9774	Ne I	50	5356,14	Cl II	10
5374,19 5373,74	Kr II Xe l	3 1	5355,45 $5355,422$	Kr II Ne I	10 150
5373 ,4951	Ar I	500	5355,176	Ne I	150
5372 ,66 5372 ,57	N I Kr I	$\frac{3}{4}$	5354,95	Cu I	250
5372,39	Xe II	300	5354,89	Si II Ar II	5
5372,3110	Ne I	75	5354,82 5353,513	Ne I	1 5
5372,29	Ar I	1	5353,46	Ar I	20
5372 ,007 5371 ,84	Ar II Al II	$\frac{2}{1}$	5353,12	CIII	0
5371,74	Kr I	$\frac{1}{2}$	5352,666 5352,1	Cu I O V	300
5371,4926	Fe I	$5\overline{0}$	5351,449	Ar II	4
5371,40 5371,10	Kr III N I	4	5351,220	NII	4
5371,10	Xe III	1	5351,072	Ti I	4
5370,979	Cs II	80	5350 , 8 5350 , 58	Cs I Ar I	$\frac{-}{20}$
5370,10	FI	5	5350,3512	Cs I	_
5369 ,97 5369 ,957	Ar I Fe I	$\begin{array}{c} 5 \\ 25 \end{array}$	5349,77	Kr III	2
5369,65	Ti I	4	5349,717	Ar II	$\begin{array}{c}2\\2\\25\end{array}$
5368,58	CII	1 1	5349 ,472 5349 ,31	Ca I Cs	25 15
5368 ,42 5368 ,07	Cu II Xe II	10	5349,204	Ne I	150
5367,67	CII	1	5349,16	Cs II	25
5367,460	Fe I	20	5348,95	Cs Ar II	25
5367,27 5367,06	N I Xe III	30	5348 ,604 5348 ,283	Ar II	$\frac{2}{3}$
5367,03	Xe II	6	5347,412	Ar I	200
5366,222	Ne I	25	5347,37	Kr I	2
5365,91	Kr I	1	5346 ,76 5345 ,077	Kr II Mari	60
5365 ,62 5365 ,485	Cu II Ar II	5 1	5345 ,9 77 5345 ,84	Mg I C III	1 1
5364 ,883	Fe I	15	5345,81	Ar I	20
$5364,626 \\ 5364,142$	Xe I Ar II	30	5345,609	Ar II	1
5363,80	Fe III	8	5344 ,534 5344 ,28	Ar II Ar I	5 5
5363,27	Xe II	150	5344,23	NI	00
5362 ,864 5362 ,48	Fe II Ar I	$\frac{5}{1}$	5343,3	O V	_
5362,42	O IV		5343,2834	Ne I	600
5362,248	Ne I	25	5342,970 5342,80	K I F I	12
5362,244	Xe i	15	5342,700	Ne I	1 1
5362,11 $5360,442$	Kr III Ne I	$\frac{1}{35}$	5342,40	CII	2
5360,030	Cu I	200	5341,78	Ar I	10
5360,0121	Ne l	150	5341 ,46 5341 ,0938	C III Ne I	0 1000
5359,95	CIII	2	5341,0255	Fe I	20
5359 ,574 5359 ,069	K I Ar II	14 2	5340 ,9418	Cs I	_
5358,616	Ar II	$\frac{z}{2}$	5340,213	ŊIJ	3
5358,53	Cs II	500	5339 ,9371 5339 ,85	Fe I C II	12
5358,363	Ar Il	6	5339,688	ΚΙ	$\frac{1}{13}$
5358,020	Ne I	10	5339,38	Xe II	1000

λ	Symbol	I	λ	Symbol	ſ
5339 ,33 5339 ,189	Ar II Ca II	1 5	5314 ,45 5314 ,258	N III Ar II	2 2
5339,13	Kr I Cl II	$\overset{\circ}{\overset{\circ}{\overset{\circ}{\overset{\circ}{\overset{\circ}{\overset{\circ}{\overset{\circ}{\overset{\circ}$	5313 ,87	Xe II	800
5338 ,92 5338 ,732	N II	4	5313 ,419 5312 ,32	N II Al II	$rac{2}{5}$
5338 ,20 5338 ,106	Kr III Ar II	$\frac{2}{1}$	5312,002 5310,99	Ar II Xe III	5 6 6
5337 ,89	Xe I C III	$\frac{1}{2}$	5310,76	Al II	2 1
5337 ,42 5336 ,809	Ti II	4	5310 ,52 5310 ,26	N I Kr II	1 4
5335 ,916 5335 ,91	Ar II Xe I	1 1	5310 ,24 5309 ,51 7	K II Ar I	$\begin{smallmatrix} 5\\200\end{smallmatrix}$
5335;710	Ne I C II	10	5309 ,493	Si IV	1
5334 ,79 5334 ,78	Kr I	10	5309 ,48 5309 ,27	N I Xe II	1 200
5334 ,42 5333 ,70	N I Cl II	1 15	5308 ,66 5308 ,074	Kr II Ar II	$\frac{200}{5}$
5333,41	Kr II Ne I	500 50	5307 ,3633	Fe I	5
5333 ,323 5332 ,89	CII	4	5307 ,223 5306 ,84	Ca II C I	7
5331 ,08 5331 ,034	Kr I Ar II	$\frac{2}{4}$	5306,609 5306,37	Cs II Xe I	$egin{array}{c} 2 \ 25 \ 3 \end{array}$
5330 ,7775	Ne I O I	$\begin{array}{c} 600 \\ 43 \end{array}$	5306,32	C I	0
5330 ,739 5330 ,664	Ar II	3	5305,690 5305,32	Ar II O IV	6 15
5329 ,712 5329 ,685	Ar II O I	$\begin{matrix} 5 \\ 12 \end{matrix}$	5305,17	Ar I C III	1 2
5329 ,15	Kr II O I	- - 4 11	5305 ,10 5304 ,971	Si IV	2
5329 ,101 5328 ,70	N I	5	5304,9	N I Ne I	1 70
5328,5336 5328,0418	Fe I Fe l	15 50	5304,7580 5304,43	Kr I	1
5328,02 5327,90	Ar I Xe II	$\frac{20}{3}$	5303 ,7766	Cs I	
5327,87	Kr I	2 1	5303 ,415 5302 ,99	Si III Fe III	2 6
5327 ,76 5327 ,07	N II Ar I	1	5302 ,35 5302 ,3073	C I Fe I	1 10
5326 ,3968 5325 ,70	Ne I Kr I	75 1	5301 ,40	Cs I	
5324 ,80 5324 ,61	Ar I Al II	5 4	5300 ,84 5300 ,761	C I Ar II	1 4
5324 ,182 5323 ,78	Fe I Cu I	$\frac{30}{3}$	5300 ,74 5300 ,55	Kr I C I	$\frac{3}{3}$
5323 ,276 5322 ,77	K I Kr II	12 60	5300 ,12	CI	1
5322,02	Kr I	2	5299,79 5299,075	Kr I Ar II	$\frac{2}{3}$
5320,953	N II Ne I	4	5299,044 5298,93	O I N III	5 1
5320,550 $5320,203$	NII	2 3	5298,887	0 1	4
5317,726 5317 ,4 6	Ar I C I	$\begin{array}{c} 60 \\ 1 \\ 22 \end{array}$	5298,429	Ti I	4
5317 ,41 5316 ,98	Kr II F I	$\begin{array}{c} 30 \\ 0,5 \end{array}$	5298, 1891, 5298	Ne I O VI	150
5316 ,806 5316 ,609	Ne I Fe II	$\frac{25}{8}$	5297 ,993	Ar II	3
5316,07	Al II	7	5297,86	N III	1
5315,9 7 5315 , 69	F I	3	5297 ,8 5297 ,236	Kr II Ti I	1 6
5315 ,214 5314 ,781	Ar II Ne I	$\frac{3}{30}$	5296 ,93 5296 ,91	C I Ar I	0
			•		68

λ	Symbol	I	λ	Symbol	I
5296,791 5296,386 5296,32 5295,892 5295,781 5295,19 5293,821 5292,75 5292,517 5292,22 5291 5291,3 5291,22 5291 5290,09 5290,035 5290,00 5289 5288,634 5288,32 5286,895 5286,47 5286,38 5286,11 5286,071 5285,48 5285,48 5285,48 5285,48 5285,48 5285,48 5285,48 5285,48 5285,48	Ar II Ar II Ar II Ar II Ti I Si II Ar II N I Cu I Xe II O VI Xe II O VI C II Ar II C II Ar II C II Ar II C II Ar II C II F I C I II Ar II C I II Ar II F I C I II Ar II C I II Ar II F I C I II Ar II F I C I II Ar II C I II Ar II F I C I II Ar II F I C I II Ar II C I II Ar II F I C I II	3 4 5 3 4 30 4 30 4 0 1650 1000 2 1 0 3 20 1 0 15 1 3 4 60 6 0,8 30 2 6 5 8 18	5276,50 5276,47 5276,42 5275,994 5275,121 5274,968 5274,61 5274,044 5274,0393 5273,580 5273,49 5273,48 5272,60 5272,53 5270,59 5270,3602 5270,270 5269,988 5269,74 5269,74 5269,74 5269,5402 5268,96 5268,96 5268,06 5267,958 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,48 5267,557	Kr II Fe III A! II Fe II O I O I Kr I Cs II Ne I Ar II N V Xe I N III C III N III Fe I Ca I Cu II Ar II Si II Fe I C I Ti II Xe II Ar II Ar II Ar II Ar II Fe I C I	100 7 2 7 4 2 4 40 40 40 1 1 6 1 30 60 30 4 3 60 4 4 50 3 5 3 1 6 6 6 4 1 5 6 6 6 6 6 6 7 8 8 8 8 8 8 8 8 8 8 8 8 8
5283,530 5283,441 5283,437 5283,43 5283,30 5282,52 5282,46 5282,378	Cu I Cu I Ti I Ar II Ar I Xe I N III Xe II	18 5 8 4 20 2 00 2	5264,783 5264,368 5264,305 5264,239 5264,215 5263,483 5263,3134 5263,21	Ar II Mg II Ar II Ca I Mg II Ti I Fe I Cs II	6 7 1 20 8 3 8 2
5282 ,29 5281 ,7970 5281 ,628 5281 ,18 5280 ,40 5280 ,24 5280 ,21 5280 ,0853	Fe III Fe I Ar II N I Ar I C I Al II Ne I	7 10 7 3 60 2 6 50	5263 ,18 5263 ,02 5262 ,244 5261 ,95 5261 ,903 5261 ,706 5260 ,91 5260 ,91	Kr III Ar I Ca I Xe II Ar II Ca I Al III N III	2 25 200 4 20 0
5279 ,84 5279 ,05 5279 ,01 5279 5278 ,62 5277 ,68 5276 ,81 5276 ,522	Kr I Ar I F I O VI Al II Al II Cu II	9 20 12 - 3 2 2 15	5260 ,57 5260 ,44 5260 ,375 5259 ,976 5259 ,89 5259 ,71 5259 ,474 5259 ,06 5258 ,223	N II Xe II Ca I Ti I Xe II C II Ar II C II	2 200 2 3 30 5 1 5 1

λ	Symbol	I	λ	Symbol	I
5257,84 5257,64 5257,24 5256,75 5256,569 5256,5633	Kr III Si II C II Kr II Ar II Cs I	2 3 7 30 3	5236 ,21 5235 ,564 5234 ,74 5234 ,620 5234 ,0271 5233 ,16	Ar I Ar II Ar I Fe II Ne I Xe III	20 4 5 7 50 3
5256,09 5255,811 5255,677 5254,4710 5253,58	C II Ti I Ar II Ar I C III		5232,9474 5232,06 5230,523 5230,41 5230,15	Fe I Kr I Ar II F I Kr II	40 2 3 15
5253 ,56 5253 ,57 5252 ,7890 5252 ,138 5252 ,105 5251 ,89	C II C II Ar I Ar II Tì I Xe I	4 300 1 8	5229,86 5229,58 5229,52 5228,18 5227,1911	Ar I Cu II Kr II Kr I Fe I	40 3 60 20 40
5251,400 5251,108 5250,6490 5250,52 5249,547	Ar II Ar II Fe I Cu I Ar II	2 3 3 6 500 400	5227,002 5226,96 5226,90 5226,8686 5226,69	Cs II F I Xe II Fe I N IV	200 3 2 15 3
5249 ,51 5249 ,373 5249 ,22 5249 ,20 5249 ,11	C II Es II Cl II Ar I C III Kr II	$\begin{array}{c} 2 \\ 80 \\ 3 \\ 40 \\ 4 \\ 4 \end{array}$	5226,62 5226,534 5225,05 5224,928 5224,558	Xe II Ti II Kr II Ti I Ti I	20 5 3 8 6
5249,06 5248,98 5248,18 5247,986 5247,75 5247,469	Xe I Ar I Ar II Xe II Ar II	4 1 3 20 1	5224,56 5224,301 5223,57 5223,66 5223,623 5222,90	Kr II Ti I Kr'I Xe III Ti I Ar I	7 15 5 20 6 20
5247,293 5246,76 5246,574 5246,24 5245,69	Ti I Ar I Ti I Ar I Cl II	5 5 3 40 4	5222,685 5222,38 5222,3517 5221,854	Ti I Kr I Ne I Ar II	6 3 50 3
5245,61 5245,389 5245,36 5245,27 5245,25	N IV Ar II Cu II Xe I Kr II	5 10 4	5221,42 5221,34 5221,2729 5220,070 5219,697	F I Cl II Ar I Cu I Ti I	0,5 75 500 500 8
5244,67 5244,28 5243,31 5242,4955 5242,13	C III F I Fe III Fe I Ar I	3 0,8 10 5 2	5219,589 5219,37 5219,30 5218,84 5218,202	Ar II Si II Ar I Kr I Cu I	1 40 40 1 2500
5241 ,786 5241 ,29 5241 ,091 5240 ,31 5239 ,71	Ar II Kr II Ar I Si II Ar I	$\begin{array}{c} 2 \\ 2 \\ 2 \\ 60 \\ 5 \\ 2 \end{array}$	5217,93 5217,93 5217,78 5217,45 5217,3964	Cl II Kr II Kr I Kr II Fe I	150 12 1 30 5
5239,71 5238,95 5238,69 5238,560 5237,65	Xe III F I Ti I Cu I	60 2 6	5216 ,816 5216 ,28 5216 ,2770 5215 ,81	Ar II Ar I Fe I Kr I	8 60 10 8
5236 ,853 5236 ,231	Ar II Ar I	$\frac{1}{2}$	5215 ,1871 5214 ,774	Fe I Ar I	6 200

λ	Symbol	I	λ	Symbol	I
5214,339 5212,780 5212,41 5212,371	Ne I Cu I Kr I Ti I	35 140 1 3	5192,3509 5192,10 5191,97 5191,4615	Fe I Xe II N II Fe I	30 80 2 20
5210,5672 5210,492 5210,386 5209,62 5209,44	Ne I Ar I Ti I Cs II Cs	50 200 40 15 15	5191 ,37 5191 ,364 5191 ,322 5190 ,56	Xe II Ar II Ne I O II	300 4 35 3
5208,8648 5208,6007 5208,32 5208,04 5207,96	Ne I Fe I Kr II Ar I F I	70 7 500 10	5190 ,380 5189 ,70 5189 ,51 5189 ,27 5188 ,848	N II Cl II N I F I	4 25 1 4 50
5207,852 5207,17 5207,128 5206,73	Ti I Ar I Cu II O II Ne I	$egin{array}{c} 1 \\ 3 \\ 10 \\ 20 \\ 5 \\ 3 \end{array}$	5188,700 5188,68 5188,6122 5188,11	Ca I Ti II Kr III Ne I Xe II	6 1 150 200
5206,565 5206,07 5206,059 5205,79 5205,15	Xe I Ti l Ar I N IV	5 10 3	5187 ,7507 5187 ,1 5186 ,99 5186 ,41 5186 ,329	Ar I N I Kr II F I Ti I	800 1 60 0,8 3
5205,11 5204,5840 5204,440 5204,29 5203,8962	N II Fe I Ar II N IV Ne I	0 5 3 5 150	5186 ,200 5185 ,90 5185 ,85 5185 ,535	N II Ti II Xe I Si II	2 2 2 100
5202 ,413 5202 ,3395 5202 ,201 5201 ,88	Si II Fe I Ar II Xe II	500 8 2 2	5185,25 5184,964 5184,48 5183,6042	Si II N II Xe II Mg I	400 4 50 45
5201 ,71 5201 ,56 5201 ,42 5201 ,096 5200 ,87	N I Kr II Xe II Ti I Cu I	2 2 20 4 500	5183,364 5183,200 5182,320 5182,30 5181,90	Cu II N II Ne I Kr II Si II	20 4 2 1 100
5200,40 5200,22 5199,9 5199,48 5198,97	N IV Kr II Xe II N II Kr I	4 60 1 1	5181 ,47 5180 ,352 5179 ,52 5179 ,35	N I N II N II N II	7 7
5198,96 5197,82 5197,569 5197,264	Ar I Kr I Fe II Si III	2 1 6 5	5178 ,82 5177 ,71 5177 ,540 5177 ,060	Xe II Kr II Ar I N II	50 6 40 4
5196 ,7343 5195 ,478 5195 ,29 5194 ,9441 5194 ,92	Cs I Fe I Ar I Fe I Xe II	- 8 1 10 5	5176 ,563 5176 ,233 5176 ,00 5175 ,891	N II Ar II O II N II	10 2 6
5194,77 5194,043 5194,02 5193,2227	Ar I Ti I Ar I Ne I	20 4 5 150	5175 ,89 5175 ,85 5175 ,426 5174 ,463 5173 ,742	Cu II Cl II Ar II N II Ti I	2 20 2 4 30
5193,1302 5193,03 5192,971 5192,86 5192,810	Ne I Cl II Ti I Si II Ar II	150 10 35 200 3	5173 ,386 5173 ,16 5173 ,15 5172 ,970	N II F II Cl II N II	5 2 25 3
5192,72	Ar I	60	5172,6843	Mg I	44

λ	Symbol	I	λ	Symbol	I
5172, 6 5172, 36 5172, 36 5172, 346 5171, 5987 5171, 45 5171, 30 5170, 168 5169, 45 5169, 030 5168, 99 5168, 06 5168, 056 5167, 73 5167, 4905 5167, 3216 5167, 3216 5163, 90 5164, 39 5163, 90 5163, 474 5162, 78 5162, 78 5162, 78 5162, 288 5162, 288 5162, 288 5162, 288 5160, 09 5160, 02 5159, 92 5159, 69 5159, 505 5158, 902 5158, 79 5158, 36 5158, 187 5158, 36 5158, 187 5158, 090 5156, 667 5156, 023 5155, 29 5154, 4271 5153, 37 5153, 4024 5153, 235 5153, 11 5152, 6813 5152, 01 5152, 01 5152, 01 5152, 01 5151, 9610	Al III Kr I N II Fe I N II N II N II N II N I Fe II N II Kr I Kr I Kr I Kr I Kr I Ar II Ar II Ar II Kr III CI II CI II CI II CI II CI II CU II C	1 2 4 20 4 20 4 2 4 1 12 1 4 4 4 1 40 42 1 80 4 8 1 7 10 10 10 500 1 4 1 10 50 8 50 1 10 50 6 8 8 1 50 2 2 2000 20 — 10 3 3 75	5148,8381 5147,483 5146,06 5145,654 5145,655 5145,39 5145,319 5145,28 5145,16 5145,122 5145,04 5145,011 5144,998 5144,9384 5144,9384 5144,9384 5144,9384 5144,9380 5143,05 5143,05 5143,03 5142,7 5141,81 5141,790 5141,10 5140,35 5139,2578 5139,4702 5139,2578 5139,17 5137,388 5137,26 5136,795 5139,17 5137,388 5137,26 5136,795 5137,388 5137,26 5136,795 5135,110 5134,17 5133,680 5137,388 5137,26 5136,795 5135,110 5134,17 5133,680 5137,26 5136,795 5135,110 5137,388 5137,26 5136,795 5135,110 5137,388 5137,26 5138,477 5133,680 5137,465 5131,106 5130,53 5129,143 5129,083 5128,031 5127,802 5127,3624	Na I Ti I O I Al II Ti I Kr I Kr II Kr II Kr II Kr II Ne I Kr I Ne I Kr II Ne I Cu I C II Ne I Kr II Kr II Kr II Kr II Fe I Cu I Kr I Kr II Cl I Kr I Fe I Kr II C II Fe I Kr II C II Fe I Kr II Fe I	1 10 5 1,5 12 1 25 4 15 35 2 500 1550 12 5 60 4 6 10 4 20 20 1 5 1 20 10 9 6 7 6 3 2 20 1 1 2 12 1 2 1 2 1 2 1 2 1 2 1 2 1
5151,68 5151,3943 5151,09 5150,86	Kr III Ar I C II Al III	$\begin{array}{c} 2 \\ 200 \\ 13 \\ 6 \end{array}$	5127,3029 5126,93 5125,765 5125,73 5125,70	C II Ar II Kr II Xe II	$\frac{2}{8}$ 400
5150 ,8425 5150 ,077 5149 ,61 5149 ,33	Fe I Ne I Kr II Fe III	6 35 3 7	5125,76 5125,598 5125,20 5125,130 5124,72	Si I C II Fe I Ar I	10 4 6 1

λ	Symbol	ı	λ	Symbol	I
5077 ,805 5077 ,23	Cu II Kr II	5 40	5056 ,314 5056 ,27	Si II K II	30 7
5076,59 5076,581 5076,473	C I Ne I Cu I	1 35 100	5055 ,981 5054 ,53 5054 ,1783	Si II Kr II Ar I	1000 30 300
5076 ,03 5075 ,92 5074 ,760 5074 ,201	Ar I Kr II Fe I Ne I	1 4 10 35	5054 ,070 5053 ,52 5052 ,930	Ti I C I Ne I	$egin{array}{c} 3 \\ 2 \\ 25 \end{array}$
5074 ,062 5073 ,590 5073 ,0758	Ne I N II Ar I	3 5 200	5052 ,879 5052 ,696 5052 ,54 5052 ,17	Ti I Cs II Xe II C I	$\begin{array}{c} 8 \\ 25 \\ 30 \\ 8 \end{array}$
5072 ,55 5072 ,30 5072 ,293	Kr II Ti II Cu II	$\begin{array}{c} 40 \\ 2 \\ 20 \end{array}$	5051 ,778 5051 ,6379	Cu II Fe I	60 10 15
5071,62 5071,475 5071,30 5070,99	N IV Ti I Ar I Ar I	$-\frac{7}{7}$ 5 40	5049 ,8253 5049 ,24 5048 ,8130	Fe I C II Ar I	$\begin{array}{c} 2 \\ 500 \end{array}$
5070 ,684 5070 ,53 5069 ,96	Cs II Xe III Kr III	1 4	5047,74 5047,738 5047,70 5047,52	Kr I He I O I Kr II	1 50 5 4
5069 ,82 5069 ,802 5069 ,66	Xe II Mg II Ar I Ti I	10 3 5 5	5047,343 5047,30 5047,11	Cu II Ar I C II	10 2 3
5069 ,351 5068 ,937 5068 ,7730 5068 ,39	Mg II Fe I Ar I	4 10 5	5047,00 5046,608 5046,51	Ar I Ne I N II	1 3 2
5068 ,332 5068 ,10 5067 ,41	Ti I Cl II Kr II	3 10 3	5046 ,31 5045 ,816 5045 ,400	Kr II Ne I Ti I	80 15 5
5067,22 5067,082 5067,0	Kr II Cu II N V	30 	5045 ,100 5044 ,98 5044 ,92	N II C II Xe II	11 1 15 <u>0</u>
5066,33 5065,985 5065,58 5065,48	Xe II Ti I Kr II Ar I	3 7 20 5	5044 ,35 5044 ,15 5043 ,800 5043 ,578	C II Ar I Cs II Ti I	5 2 80 7
5065,448 5065,016 5064,654	Cu II Fe I Ti I	40 6 25	5042 ,86 5042 ,853 5042 ,416	Kr III Ne I Ar II	2 15 1
5064,15 5064,068 5063,99	C I Ti I Ar I	0 4 5	5041 ,828 5041 ,80	Cs II C I	5 6 2
5062 ,72 5062 ,112 5062 ,036	Ar I Ti I Ar II	1 7 30	5041 ,76 5041 ,7585 5041 ,620 5041 ,598	Fe I Ca I Ne I	10 40 1
5061,46 5060,635 5060,0793 5059,866	Kr III Cu II Ar I Cs II	2 30 500 25	5041 ,48 5041 ,322 5041 ,23	C I Cu II Ar I	6 10 10
5059 ,66 5059 ,394 5059 ,150	C I Ar II Ne I	0 2 2 30	5041 ,0747 5041 ,026 5040 ,74		$\begin{array}{c} 7 \\ 1000 \\ 2 \end{array}$
5058, 897 5058, 08 5057, 68 5056, 53	Cu II Kr I C I Ar I	4 0 200	5040 ,72 5040 ,69 5040 ,642 5040 ,51	N II F I Ti I Ar I	3 0,6 6 10

λ	Symbol	I	λ	Symbol	I
5040,34 5040,13 5039,959 5039,07 5039,002 5038,400 5037,8 5037,7512 5037,577 5037,16 5036,468 5036,294 5036,15 5035,989 5035,989 5035,988 5034,36 5034,25 5033,85 5032,07 5032,07 5032,026 5031,901 5031,483 5031,3504 5030,778 5030,778 5030,778 5030,775 5029,64 5029,15 5028,81 5028,36 5028,2796 5028,131 5025,74 5025,662 5024,92 5024,842 5024,778	Kr I C I Ti I C I Ti I Cu II Ti I Li II Ne I O I Ti I Fe I Xe II Ne I C II Ti I Ar I Cu I Ar I Kr II Fe I Ne I Ne I Ti I Fe I Ne I Ti I Ar I Ti I Ar I Ti	7 4 22 7 10 25 6 500 3 15 25 6 335 5 25 100 100 7 60 6 2 250 2 6 5 1 30 200 4 1 9 18 3 20 1	5018,783 5018,75 5018,72 5018,434 5018,39 5018,06 5017,76 5017,629 5717,34 5017,25 5017,160 5017,09 5016,611 5016,58 5016,45	O I Ne II Kr III Fe II C IV C I C I Ar II Ar II Ar II Ar II C IV Kr III N II Ti I T	5 1 2 12 2 2 1 10 1 5 20 3 400 1 20 9 20 1 500 10 5 10 1 25 25 1 100 18 5 50 20 2 12 6 2 5 10
5024,50 5024,027 5023,88 5023,85 5023,048 5022,871 5022,870 5022,40 5022,250	Ar I Cu II Xe I C I N II Ti I Ne I Kr II Fe I	1 5 3 7 5 25 25 200 6	5009,833 5009,652 5009,334 5008,55 5007,325 5007,209 5007,09 5006,84 5006,787	Cu II Ti I Ar II Xe III N II Ti I Ar I Ar I Cu II	20 7 30 10 11 40 $\frac{2}{2}$ 30
5022,06 5021,88 5021,285 5021,138 5020,43 5020,217 5020,139 5020,028 5019,971 5019,291	N II Kr II Cu II Ca II Kr II O I Cu II Ti I Ca II O I	0 100 20 4 4 7 5 25 8 6	5006,1254 5006,0607 5005,725 5005,60 5005,333 5005,1587 5005,149 5005,13 5004,318 5003,88	Fe I Si I Fe I K II Ne I Ne I N II Ar I N II	20 40 10 8 50 500 14 1 20 0

λ	Symbol	I	λ	Symbol	I.
5003,561 5002,7998 5002,703 5002,14 5002,02 5001,98 5001,871 5001,641 5001,479 5001,477 5001,136 5001,01 5000,991 5000,97 5000,395 4999,65 4999,504 4998,54 4998,502 4997,482	Ne I Fe I N II Kr I Fe III F II Fe I Cs Ca II N II Xe II Ti I Al II Ne I Ar I Ti I Kr II Ne I Ne I	2 6 9 2 8 3 12 2 7 12 11 3 10 3 3 45 5 10 15	4980,006 4979,625 4979,05 4978,89 4978,5414 4978,191 4977,731 4977,08 4976,62 4975,961 4975,66 4975,344 4974,760 4974,41 4974,18 4974,151 4973,689 4973,538 4973,53	Cu II Ne I Ar I Kr II Na I Ti I Ti I Kr III Cl I Ne I Ar I Ti I Xe II Xe II Ar I Cu II Cu II Ne I Ar I	10 5 1 100 1 10 5 2 10 10 2 10 2 10 10 10 2 10 10 10 5 10 10 10 10 10 10 10 10 10 10 10 10 10
4997,227 4997,099 4996,782 4996,209 4995,52 4994,363 4994,363 4994,1323 4993,93 4993,746 4993,03 4991,66 4991,41 4991,240 4991,17 4991,067 4989,948	N II Kr II Ti I Ar II Ne I Cl II Ne I N II Fe I Xe II Ar II C I N II Ar I C I Ti I Ar I	4 1 8 2 2 60 150 10 8 5 2 10 1 0 5 100 5	4973,108 4973,051 4972,71 4972,593 4972,157 4971,77 4971,720 4971,71 4971,64 4970,12 4969,88 4969,812 4969,812 4969,88 4969,36 4969,08 4969,08 4968,793 4968,566	Fe I Ti I Xe II Cs II Ar II Cl I Li I Xe II Cl III Cl III Ar I Cu II Kr I Kr I O I Ti I	3 6 400 25 15 — 50 200 0 50 1 3 0 15 20 8 6
4989,31 4989,140 4988,963 4988,77 4988,52 4987,367 4986,43 4985,5539	F I Ti I Fe I Xe II Kr III N II F I Fe I	$\begin{array}{c} 2\\ 10\\ 6\\ 300\\ 10\\ 8\\ 2,5\\ 7 \end{array}$	4967,882 4967,378 4966,0968 4965,78 4965,073	O I O I Fe I Kr III Ar II	7 6 8 2 25 10
4985,503 4985,260 4985,136 4985,09 4983,855	Cu II Fe I Cu II Ar I Fe I	40 7 2 10 6	4965,00 4964,73 4964,713 4962,8 4962,10 4960,65	Xe II C II Ti I Xe II Al II F I	4 4 5 1 3 6
4983 ,258 4982 ,83 4982 ,8134 4982 ,81 4982 ,507	Fe I Kr II Na I Ar I Fe I	5 50 2 1 8	4960 ,25 4959 ,92 4959 ,478 4958 ,85 4958 ,67	Kr II C II Ar II F I C II	100 1 1 3 1
4981 ,732 4981 ,54 4980 ,45	Ti I F I F I	60 1,5 0,8	4957,6059 4957,3054 4957,122	Fe I Fe I Ne I	60 20 150 693

	<u> </u>	<u> </u>		·	
λ	Symbol	I	λ	Symbol	I .
4957,0335 4956,750	Ne I Ar I	1000 100	4937 ,718 4937 ,196	Ar I Cu II	$\begin{array}{c} 30 \\ 20 \\ \end{array}$
4956 ,146 4956 ,01 4955 ,964	K I F I Cu II	9 1 5	4936 ,99 4936 ,083	Cl II Ar II	25
4955,78 4955,41	O II F I	3 1,5	4935,03 4934,48 4933,8	N I Kr I N V	10 4
4955 ,382 4955 ,27	Ne I Kr I	150 15	4933 ,25 4933 ,206	F II Ar II	$\begin{array}{c} -5 \\ 5 \\ 25 \end{array}$
4955 ,21 4955 ,111 4953 ,85	Ar I Ar II C II	$egin{array}{c} 2 \ 7 \ 3 \end{array}$	4932,80 4932,05	Si II C I	20 8
4953 ,733 4952 ,924	Cu II Ar II	$\begin{array}{c} 50 \\ 2 \end{array}$	4931 ,76 4931 ,653	Cl II Cu II	$\frac{2}{100}$
4952,835 $4952,20$	Cs II F I	$\frac{30}{2,5}$	4931 ,483 4930 ,944 4930 ,45	Cu II Ne I F I	20 50 1
4951 ,75 4951 ,627 4054 ,454	Ar I Cu II Cu II	$\begin{array}{c} 10 \\ 12 \\ 3 \end{array}$	4930,38 4929,16	Kr I Ar I	$\frac{1}{4}$
4951,454 4951,27 4950,815	N V K I		4928 ,83 4928 ,342	F I Ti I	$\frac{2}{12}$
4950 ,16 4950 ,105	F I Si IV	1 3	4928 ,235 4927 ,53 4926 ,67	Ne I Xe III F I	70 3 0,8
4949 ,64 4949 ,479	Ar I Cu II	$\begin{bmatrix} 1 \\ 3 \end{bmatrix}$	4926 ,40	CI	0
4949,398 4948,50 4948,183	Ar II Kr II Ti I	$\begin{array}{c} 5 \\ 50 \\ 3 \end{array}$	4926,390 4926,148 4925,744	Cu II Ti I Cs II	$\begin{array}{c} 20 \\ 4 \\ 5 \end{array}$
4947 ,6067 4946 ,72	Si I Xe II	30 1	4925 ,396 4925 ,17	Ti I Cl II	5 15
4945,59 4945	Kr II N V	300	4924 ,83 4924 ,7753	Cl II Fe I	10 3
4944 ,9899 4944 ,80 4944 , 56	Ne I Ar I N V	100 5 9	4924,60 4924,28	Cl II	6 18
4943,58 4943,24	Cl II C I	0 1 5	4923,916 4923,1522 4922,68	Fe II Xe I C I	12 500 1
4943 ,24 4943 ,06 4943 ,020	K II O II Cu II	$\begin{bmatrix} 6\\7\\20 \end{bmatrix}$	4922,50	Ar IV	
4943 ,01 4943	Cs II N V	10	4922 ,3 4922 ,14 4921 ,9310	Ne II Cl II IIe I	0 20 100
4942,915 4942,02 4942,015	Ar II C I K I	6 0 8	4921 ,768 4921 ,48	Ti I Xe II	12 800
4941,562 4941,12	Ti I O II	3 5	4921 ,461 4921 ,042	Cu II Ar I	3 80
4940 ,21 4940 ,060	Kr III Cu II	2 5	4920,5096 4920,031 4919,867	Fe I Cu II Ti I	$\begin{array}{c} 60 \\ 5 \\ 12 \end{array}$
4939 ,6896 4939 ,0457	Fe I Ne I	4 100	4919,66	Xe II	200
4938 ,8206 4938 ,75	Fe I K II	10 3	4919 ,0003 4918 ,98 4918 ,373	Fe I Al II Cu II	$\begin{array}{c} 30 \\ 3 \\ 30 \end{array}$
4938,59 4938,38 4938,283	Cl I Kr I Ti I	- 2 8	4917 ,85 4917 ,72	Ar I Cl II	5 125
4937,97	Kr II	1	4916,508 4915,94	Xe I Kr II	500 100
4937 ,967 4937 ,719	Cu II Ti I	15 4	4915 ,821 4915 ,236	Cu II Ti I	15 5

2	Symbol	,		Symbol	
λ	Symbol	I	λ	Symbol	I
4915,03 4914,90 4914,62 4914,32 4914,309	Ar I N I Kr II Cl II Ar II	1 5 2 12 2	4890,09 4889,690 4889,033 4888,91 4888,37	Xe II Cu II Ar II C I F I	300 30 45 1 0,8
4913,616 4912,909 4912,362 4912,332	Ti I Cu II Cu II Si III	$\begin{array}{c} 20 \\ 20 \\ 15 \\ 4 \end{array}$	4888,365 4888,263 4887,9478 4887,30	Ne I Ar II Ar I Xe II	5 5 200 300
4910 ,39 4910 ,025 4909 ,726 4909 ,71	Kr I Fe I Cu II Ar I	$\begin{array}{c}2\\2\\100\\2\end{array}$	4886,30 4886,29 4885,19 4885,084	N I Ar I Xe II Ne I	2 30 4 100
4909,032 4908,52 4908,34 4908,18 4907,17 4906,99	Cu II Ar I Kr II Si II Cl II Si II	5 10 2 5 15 20	4885,082 4884,9170 4884,25 4884,15 4884,14	Ti I Ne I F I Xe II N III	20 1000 2,5 100
4906,88 4906,548 4906,28 4905,20 4904,76 4904,753 4903,71	O II Cu II Kr III Xe II Cl II Ar II Al III	$5 \\ 20 \\ 6 \\ 2 \\ 135 \\ 12 \\ 4$	4883,86 4883,761 4883,53 4883,403 4883,27 4883,217 4883,20 4882,233	Ar I Cu II Xe II Ne I Ar I Cu II Si II Ar II	5 3 600 15 30 3 15
4903,3169 4902,77 4902,65 4901,412	Fe I Al II Si II Cu II	12 5 3 25	4881,81 4881,79 4881,3 4880,922	N III N I Li II Ti I	0 1 3 3
4901 ,26 4900 ,625 4899 ,910 4899 ,9	Ar I Ti I Ti I Xe II	2 7 20 1	4880,46 4879,95 4879,860	F I Cs II Ar II	0 ,6 2 30
4899,64 4899,013 4898,94 4898,76 4898,63 4898,52	Al II Ne I Cl II Al II C I Al II	$\begin{array}{c} 3 \\ 50 \\ 7 \\ 5 \\ 1 \\ 2 \end{array}$	4878, 2182 4878, 132 4877, 96 4877, 70 4876, 50	Fe I Ca I Ar I Cl II Xe II	12 50 1 5 500
4898,06 4897,924 4897,2 4896,77 4896,71	F I Ne I Kr II Cl II N III	1 70 3 200 0	4876 ,2619 4875 ,63 4874 ,02 4873 ,87 4873 ,58	Ar I Kr II F I Kr III N III	200 1 1,5 1 2
4896,396 4895,111 4894,6909 4894,53 4893,43	Cu II N II Ar I Ar IV C I	$ \begin{array}{r} 3 \\ 8 \\ 150 \\ \hline 0 \end{array} $	4873 ,291 4872 ,73 4872 ,1444 4871 ,78 4871 ,58	Cu II Ar I Fe I Ar IV O II	$ \begin{array}{r} 15 \\ 10 \\ 20 \\ \hline 5 \end{array} $
4892, 228 4892, 21 4892, 1007	Ne I Kr III Ne I	10 5 500	4871,3244 4870,14 4870,129 4870,024	Fe I Kr II Ti I Cs II	25 20 20 30
4891 ,62 4891 ,52 4891 ,4989 4890 ,93	Cl II Cl I Fe I O II	$\frac{\frac{4}{50}}{\frac{4}{4}}$	4869 ,757 4869 ,47 4868 ,845	K I Xe III Mg II	$\begin{array}{c} 30 \\ 9 \\ 40 \\ 2 \end{array}$
4890 ,7616 4890 ,65 4890 ,19	Fe I C I Ar I	$\begin{array}{c} 25 \\ 2 \\ 1 \end{array}$	4868,69 4868,268 4868,264	FÎ Ne I Ti I	0 ,5 70 18

λ	Symbol	I	λ	Symbol	I
4867,84 4867,557 4867,24 4867,07 4867,010 4866,476 4866,33 4866,10 4865,919 4865,919 4864,95 4864,91 4864,95 4864,91 4864,24 4864,187 4863,75 4863,483 4863,0800 4862,57 4862,54 4861,33 4861,33 4861,33 4861,33 4861,33 4861,095 4861,03 4860,170 4860,029 4859,7480 4859,604 4859,6 4859,6 4859,6 4859,6 4859,7 4859,6 4859,7 4859,7 4859,6 4859,7 4859,6 4859,7 4859,6 4859,7 4859,6 4859,7 4859,6 4859,7 4859,6 4859,7 4859,6 4859,7	Ar I Ar II Kr II N III C II Ne I Ne I F I Cu I Ar II Ne I O II Kr I Ne I Cl III Kr I Cu II Kr I Cu II H N III Kr I Si II O II Ne I C III T Ar I F II He II N III Kr II C III T Ar I C III C	10 5 1 5 2 70 80 2 75 12 1 100 3 2 30 10 4 1 8 100 4 800 1 2 2 500 4 4 10 3 4 10 3 4 10 5 10 10 10 10 10 10 10 10 10 10	4851,501 4851,248 4851,082 4850,550 4849,865 4849,530 4849,4 4848,487 4847,315 4847,368 4847,368 4847,296 4847,13 4846,73 4846,73 4846,60 4845,767 4845,26 4845,145 4845,14 4845,01 4844,33 4843,45 4845,14 4845,01 4844,33 4843,45 4843,294 4843,294 4843,294 4842,941 4842,57 4842,566 4842,44 4842,290 4841,9 4840,87 4839,861 4839,251 4839,251 4839,04 4837,93 4837,3139 4836,79 4836,697 4836,697 4836,56 4836,125 4837,93 4837,93 4837,93 4837,93 4837,93 4837,93 4837,93 4837,93 4839,861 4839,251 4839,251 4839,04	Ne I Cu II Mg II Si II K I Ne I Ne II Ti I Ar II N I Cu II Ca I F I Cl II Ar II Ne I Kr II Ne I Si II Ne I Si II Ti I Xe II Si I Ti II Xe II Xe II Cl	60 15 7 5 7 30 0 8 25 2 2 2 2 0,5 4 5 700 5 2 3 15 2 1 2000 0 300 1 50 5 10 8 25 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4851 ,583 4851 ,540	Kr II Cs Si I	2 8 13	4830 ,161 4829 ,709 4829 ,47	Cs II Xe I Ar I	$\begin{array}{c} 30 \\ 400 \\ 2 \end{array}$

λ	Symbol	I	λ	Symbol	I
4829,288 4829,23 4829,23 4828,968 4827,587	Ne I Cl II K II Si III Ne I	5 3 9 18 300	4806 ,924 4806 ,92 4806 ,017 4805 ,651	Cs II Xe II Ar II Cu II	5 3 35 3
4827,3444 4826,80 4826,08 4825,97	Ne I C I Kr III Ar I	1000 3 2 2	4805 ,4402 4805 ,416 4805 ,105 4804 ,61	Si I Ti I Ti II Cs	20 12 2 10
4825 ,529 4825 ,445 4825 ,42 4825 ,18	Ne I Ti I Cs Kr II	50 3 10 300	4804,348 4804,33 4803,289 4803,225 4803,16	K I Ar I N II Ne I Cl II	8 5 10 1 2
4823 ,93 4823 ,41 4823 ,370 4823 ,31	O IV Xe II Ne I Si I	300 50 10	4803,16 4802,981 4802,97 4802,70 4802,363	O I Kr II C II Ne I	4 4 1 10
4823,174 4821,9236 4821,87 4821,1666	Ne I Ne I Cl II Si I	$100 \\ 300 \\ 2 \\ 15 \\ 4$	4802,132 4801,80 4801,076 4800,77	O I O I Ne I O IV Si III	3 2 2 — 8
4820,95 4820,410 4819,937 4819,79 4819,718	Cl II Ti I Ne I Cl II Si III	20 70 25 16	4800 ,428 4800 ,111 4799 ,973 4799 ,797	Ne I Ca II Ti I	15 4 12
4819,46 4818,789 4818,64 4818,42	Cl II Ne I Cl I Cl I	200 150 2 3	4799 ,754 4799 ,45 4799 ,2 4798 ,742	K I Xe II O IV Ar I	6 15 10 30
4818,02 4817,6386 4817,37 4817,22	Xe II Ne I C I Xe II	200 300 4 40	4798 ,535 4798 ,40 4798 ,25 4797 ,983	Ti II Cl II O IV Ti I	2 15 5
4816 ,900 4814 ,338 4813 ,330 4813 ,07	Ne I Ne I Si III O IV	1 50 15 1	4797 ,042 4796 ,76 4796 ,57 4796 ,53	Cu I Cl I Ar I Xe II	20 2 1 6
4812,940 4812,92 4812,6367 4812,240 4811,76	Cu II C I Kr I Ti I Kr II	40 2 40 5 300	4796,33 4796,210 4796,08 4795,88 4795,62	Kr II Ti I C I C I Ne II	$\begin{array}{c} 60 \\ 6 \\ 0 \\ 0 \\ 2 \end{array}$
4811,76 4811,57 4811,074 4810,634 4810,51	Cl II Ti I Ne I Kr I	12 4 100 3	4795 ,40 4794 ,54 4794 ,48 4794 ,22	Xe II Cl II Xe III O IV	$\begin{array}{c} 3 \\ 250 \\ 12 \\ 2 \end{array}$
4810 ,306 4810 ,0640 4810 ,06	N II Ne I Cl II	4 150 225	4794,10 4794,00 4793,66	Ar I Cu I C III N II	$\begin{array}{c} \overline{1} \\ 150 \\ 2 \\ 4 \end{array}$
4809,500 4809,05 4808,66 4808,531 4808,00	Ne I Cl II Ar IV Ti I Cl III	10 9 - 5 1	4793 ,650 4792 ,65 4792 ,6192 4792 ,482	C I Xe I Ti I	0 150 10
4807,68 4807,039 4807,019	Cl II Cu II Xe I	5 10 500	4792 ,324 4792 ,29 4792 ,212 4792 ,090	Si I Si II Si I Ar II	80 5 35 6

λ	Symbol	I	λ	Symbol	I
4792,04	Cl II	12	4773 ,01	Kr II	40
4791,71	C I	0	4772 ,913	O I	4
4791,248	Fe I	5	4772 ,7847	Si I	25
4791,15	Ar I	2	4772 ,57	O IV	2
4791,15	Kr II	3	4772 ,448	O I	3
4791,049	K I	7	4771,75	C I	$egin{array}{c} 8 \\ 20 \\ 3 \\ 40 \\ 2 \\ \end{array}$
4790,728	Ne I	30	4771,66	Cl II	
4790,218	Ne I	500	4771,103	Ti I	
4790,20	Xe II	3	4771,09	Cl II	
4789,74	Kr III	7	4770,34	Ar I	
4789,6537	Fe I	7	4770,03	C I	5
4789,600	Ne I	100	4769,775	Ti I	4
4788,9270	Ne I	1000	4769,05	Xe II	150
4788,8	Li II	8	4768,68	Cl II	150
4788,76	Kr II	5	4768,6750	Ar I	150
4788 ,131	N II	8	4768 ,41	Cs	10
4787 ,77	Xe II	100	4767 ,49	Cu I	75
4787 ,7	O IV	3	4766 ,729	Cu II	5
4786 ,8106	Fe I	5	4766 ,68	C I	4
4786 ,7	C IV	0	4766 ,330	Ti I	4
4786 ,65	Xe II	10	4765 ,74	Kr II	$1000 \\ 10 \\ 25 \\ 1 \\ 25$
4786 ,491	K I	5	4765 ,30	Cl II	
4786 ,4	O IV	20	4764 ,862	Ar II	
4786 ,363	Cs II	15	4764 ,535	Ti II	
4786 ,155	Ar II	5	4763 ,616	Cs II	
4785 ,88 4785 ,44 4784 ,8 4784 ,022 4783 ,80	C IV Cl II Kr II Ne I C I	1 50 1 2 1	4762,77 4762,54 4762,43 4762,31 4762,10	Ti II C I Kr II C I N IV	1 5 300 5
4783 ,43	O IV	4	4759 ,272	Ti I	25
4782 ,9905	Si I	50	4758 ,972	Si I	13
4782 ,89	Si II	3	4758 ,92	Cs	10
4781 ,95	Ne II	1	4758 ,913	Ti I	4
4781 ,82	Cl II	50	4758 ,77	Kr II	1
4781 ,718	Ti I	6	4758 ,728	Ne I	150
4781 ,32	Cl II	75	4758 ,421	Cu II	30
4781 ,239	Ne I	2	4758 ,120	Ti I	25
4781 ,190	N II	4	4757 ,87	Cs	10
4780 ,884	Ne I	30	4757 ,389	K I	7
4780,338	Ne I	300	4757 ,215	Ar II	1
4779,986	Ti II	1	4755 ,64	Cl II	50
4779,722	N II	7	4755 ,2756	Si I	25
4779,18	Ne II	80	4754 ,48	Kr III	6
4779,09	O IV	2	4754 ,440	Ne I	100
4778,93	Cl II	45	4753,934	K I	5
4778,259	Ti I	10	4753,49	Cl II	8
4776,38	Cl II	5	4753,458	Cu II	3
4776,22	Cu I	20	4753,13	N I	2
4776,20	Si II	3	4753,123	Ne I	1
4775,91 4775,76 4775,18 4774,92 4774,46	C I Xe II Xe II K II Kr II	6 8 5 4 2	4752,9404 4752,7320 4752,70 4752,50 4752,02	Ar I Ne I O II N IV Kr II	150 500 2 100
4774 ,241	N II	4	4751 ,8218	Na I	$\begin{array}{c}2\\30\\4\end{array}$
4773 ,752	O I	5	4751 ,802	Ne I	
4773 ,19	Xe II	80	4751 ,34	O II	

	_				
λ	Symbol	I	λ	Symbol	I
4751 4750,686 4750,26 4749,73 4749,5754 4749,5754 4749,00 4748,67 4748,23 4747,9410 4747,680 4747,28 4746,823 4744,77 4744,60 4744,345 4744,04 4743,89 4742,791 4742,791 4742,791 4740,71 4740,40 4740,71 4740,40 4740,40 4740,26 4739,665 4739,588 4739,42 4739,00 4739,588 4739,42 4739,00 4738,41 4738,41 4738,41 4738,60 4737,97 4736,7807 4735,905 4735,46 4735,46 4734,682 4734,682 4734,682 4734,682 4734,682 4734,682 4734,682 4734,682 4734,687 4734,682 4734,687 4734,682 4734,682 4734,682 4734,682 4734,687 4734,682 4734,687 4734,682 4734,687 4734,687 4734,682 4734,687	O VI Ne I N I N V Ne I Cs II Kr III Cl II Ar I Si I Ti I C II K II Cs II K I N I Ti I C I Ti I Ti I C I Ti I Ti I C I Ti	$\begin{array}{c} -0.000 \\ -0.00$	4731,172 4730,664 4730,666 4730,519 4730,24 4730,0285 4729,72 4728,18 4727,48 4727,44 4726,889 4724,33 4724,162 4724,10 4723,810 4723,810 4723,57 4723,171 4722,714 4722,714 4722,150 4721,594 4721,594 4721,594 4721,594 4721,594 4721,636 4721,43 4721,24 4721,00 4719,94 4719,94 4719,515 4719,37 4719,22 4718,38 4716,651 4716,19 4715,3466 4715,295 4715,132 4714,336 4714,28 4713,376 4713,455 4712,63	Ti I Ar II Ar II Si III Ne II C III Mg I Kr III Cs Ar I C II Ar II Cs II Ne I Kr I Ne I Ti I Ne I Ti I Ne I Ti I Ne I Cl II Ca II Ar I Ne I Cl II Ca II Ne I Cl II Ca II Ne I Cl II Ca II Ne I Ti II Ne I Cl II Cl	9 3 5 7 0,5 1 10 4 10 5 2 25 5 70 20 1 5 70 30 10 15 10 3 5 12 2 70 25 8 4 2 20 1 1,5 2 70 36 10 1500 4 30 100 30 70 8 20 150 40 40
4732,51 4732,056 4731,22 4731,19	Xe II Ar II N I Xe II	15 12 1 100	4712,135 4712,07 4712,066 4710,823	Ne I N II Ne I Ar II	15 2 1000 7
4101,10	•		•		69

λ	Symbol	I	λ	Symbol	I
4710,48 4710,478 4710,186 4710,0669 4710,04 4710,04 4709,59 4709,50 4709,08 4708,92 4708,8619 4708,46 4708,21 4707,80 4707,31 4707,2807	Kr III Ne I Ti I Ne I Ne II Ne II O II N II Ar I Xe II Xe II Xe I O II Xe I O II	10 30 18 1000 2 5 2 30 10 8 1200 2 5 0 4 8	4696,923 4696,36 4695,89 4695,66 4695,610 4695,363 4695,07 4694,84 4694,637 4694,44 4693,670 4693,65 4693,34 4692,482 4691,580 4691,53	Ti I O II N II Kr II Cs II Ne I Cl III Kr I N II Kr II Ti I Kr III Xe II Cs II Ne I Cl I	4 2 2 50 10 20 1 4 6 200 5 3 15 5 15
4706,96 4706,76 4706,40 4706,31 4705,44 4705,355 4704,67 4704,594 4704,3949 4704,35 4704,24 4703,359	Xe II Si I N II Kr II Kr II O II Xe II Cu I Ne I Ar I	2 8 2 3 2 8 10 450 1500 2 2 9	4691,53 4691,47 4691,336 4691,28 4690,9711 4690,97 4690,827 4688,392 4688,3 4688,191	CII O II Fe I Ti I Kr II Xe I O II Ar IV Ti I Ti I Kr II Ne I	12 1 6 20 100 100 0 — 3 3 3 2
4703,18 4703,14 4703,06 4702,9909 4702,526 4702,51 4702,3155 4701,793 4701,76 4701,71 4701,65 4701,23	O II Cl III F I Mg I Ne I N II Ar I Cs II O II Cu I Al III O II	3 3 1 30 150 2 1200 25 0 10 6 2	4687,770 4687,6724 4687,28 4686,921 4686,30 4685,74 4685,682 4685,4 4685,265 4685,17	Cu II Ne I Kr II Ti I Kr II N I He II C IV Ca I Xe III	5 100 10 4 8 3 300 1 12 1
4701,2 4700,469 4700,1 4700,04 4699,69 4699,62 4699,21 4698,99 4698,96 4698,766 4698,766	Ne II Ne II Ne II N II Kr II Xe II O II O II Ti I N II	0 5 0 2 30 3 7 3 6 20 1	4683,797 4683,764 4683,68 4683,53 4683,238 4683,022 4682,910 4682,277 4682,146 4681,990 4681,930 4681,908	Si III Ne I Kr II Xe III Ne I Si III Ne I Ar II Ne I Cu II Ne I Ti I	7 30 5 60 5 9 10 10 20 50 20 30
4698,48 4698,01 4697,87 4697,490 4697,49 4697,020 4697,00 4696,943	O II Xe II Ar IV Cu I Xe III Xe I F I Ne I	300 350 2 300 0,6 5	4681,494 4681,200 4680,41 4680,363 4679,45 4679,135 4678,852 4678,604	Ar II Ne I Kr II Ne I Xe II Ne I Fe I Ne I	2 50 500 100 3 150 7 50

λ	Symbol	I	λ	Symbol	I
4678,31 4678,218 4678,14 4677,76 4677,76 4677,76 4677,16 4677,00 4676,75 4676,73 4676,73 4676,46 4676,234 4675,118 4674,909 4674,89 4674,72 4674,56 4674,40 4673,95 4673,80 4673,75 4673,70 4673,75 4673,70 4673,66 4673,555 4673,297 4673,297 4673,297 4673,297 4673,297 4673,209 4671,8	Symbol Xe II Ne I N II Cl I Li II Cu I Kr I O II Xe II O II Ti I N II Cs Cu I Xe II Cl I C III Kr II O II Si IV Si II Cu II Xe II Cu II	2 300 6 7 8 30 1 0 2 8 200 8 10 5 10 500 40 2 6 3 3 4 3 30 30 2 20 3 100 2 4 40	λ 4663,054 4662,638 4661,350 4661,350 4661,22 4661,1054 4660,294 4660,294 4669,38 4659,06 4658,87 4658,30 4657,78 4657,78 4657,72 4656,92 4656,65 4656,468 4656,3936 4656,468 4656,3936 4656,3936 4655,75 4655,75 4655,359 4654,538 4654,532 4654,118 4654,05 4653,699 4653,00	Symbol Al II Cu II O II Cu II Cu II Ne I Cu II Ne I Cu II Kr II C IV Ar II Xe III N I Si IV N I Cs II Ti I Ti I Ti I Ti I O I O I O I N II Si IV O I Cl I Ne I Xe II	10 15 9 15 18 150 8 2 5 2000 9 25 9 1 3 1 1 2 25 300 6 1 3 3 2 5 10 40
4671,61 4671,226 4670,884 4670,280 4669,77 4669,53 4669,50 4668,5595 4668,49 4668,1422 4667,585 4667,459 4667,356	Kr I Xe I Ne I Cs II N I O II O II Na I Xe II Fe I Ti I Fe I	10 2000 70 20 3 0 0 0 2 100 6 25 6 100	4652,101 4652,06 4651,94 4651,47 4651,388 4651,124 4651,08 4651,01 4650,841 4650,646 4650,544 4650,25	Ne I C III Xe II C III Ar I Cu I Cs N I C III O II Al II Al II	30 5 200 11 20 2000 10 1 5 6 1,5 2
4667,297 4667,206 4667,14 4666,8 4666,654 4666,28 4666,260 4665,869 4665,869 4664,8107 4663,64 4663,518	Cu II N II Si IV Al II Ne I Xe II Ar II Si III C III Na I C III	15 5 1 11 50 40 1 8 8 1 6 20 40	4650,25 4650,17 4650,016 4649,904 4649,266 4649,17 4649,139 4648,933 4648,62 4647,493 4647,493 4647,493 4647,4370 4647,42 4647,40 4647,34	Kr II Ti I Ne I Cu II Xe II O II Fe II Al II Ar I Si IV Fe I C III Ti IV Ne II	10 10 70 10 2 10 10 40 1 6 14 3 0,5

λ	Symbol	I	λ	Symbol	I
4613 ,67 4613 ,11	0 II 0 II	1 0	4592 ,6547 4592 ,29	Fe I Cl II	5 2
4612,89	Ne II	1	4592,05	Xe II	300
4611 ,8896 4611 ,289	Xe I Fe I	100 5	4591,50	Kr II	1
4611,27	Si IV	$\frac{0}{3}$	4591 ,10 4590 ,971	Cl III O II	$\frac{4}{9}$
4611 ,245 4610 ,65	Ar II Kr II	$\overset{\circ}{60}$	4589,961	Ti II	2
4610,505	Cs O II	$\begin{array}{c} 10 \\ 3 \end{array}$	4589,896	Ar II O I	$\frac{25}{3}$
4610,14 $4609,99$	Cs II	10	4589 ,89 4589 , 7 5	Al II	4
4609,910	Ne I Kr II	$\begin{array}{c} 150 \\ 20 \end{array}$	4589 ,689 4589 ,288	Al II Ar I	1 80
$4609,72 \\ 4609,7$	Al II	1	4588 ,98	0 I	
4609,560 4609,42	Ar II O II	$egin{array}{c} 25 \ 4 \end{array}$	4588,194	Al II	2 5 3 3
4609,365	Ne I	30	4588, 13 4587, 895	Ne II Ar II	3 3
4608 ,48 4608 ,457	Kr II Cu II	1 5	4587,6	CIII	0
4608,45	K II	8 5	4587 ,21	Ar I	5
4608 ,21 4608 ,085	Cl III N II	о 3	4586 ,97 4586 ,610	Cu I Ar I	1300 10
4607,157	N II	10	4586,145	Ne I	$\frac{2}{2}$
4606,33 4604,938	N IV Ne I	6 5	4585,923	Ca I	
4604 ,680 4604 ,43	Ne I Cl III	1 0	4585 ,876 4585 ,871	Ne I Ca I	10 50
4604,45	Ne I	15	4585 ,82	AlII	$\begin{array}{c} 6 \\ 500 \end{array}$
4604,02	Kr II	60	4585,48 4585,03	Xe II Cl II	300 15
4603.755 4603.73	Cs II N V	$rac{60}{12}$	4584,958	Ar I	10
4603,2	N V Xe II	600	4584 ,28	Cl II	20
4603 ,03 4602 ,9446	Fe I	9	4583 ,848 4583 ,443	Fe II Ti II	11 1
4602,871	Li I	100	4582,980	Ne I	5
4602 ,53 4602 ,11	N II O II	$\frac{3}{2}$	4582,85	Kr II	300
$4602.02 \\ 4601.480$	Li I N II	1 11	4582 ,7474 4582 ,556	Xe I Ne I	300 15
4601 ,42	Kr II	1	4582,4521	Ne I Cl II	150 8
4601 ,00 4600 ,11	Cl I Ne II	$\frac{20}{1}$	4582,40		
4600,02	Ar II	1	4582 ,105 4582 ,035	Ne I Ne I	15 150
4599,23	Ti I Cs	5 15	4581 ,402 4580 ,70	Ca I Xe II	40 80
4599,22 4598,760	Ar II	10	4580,47	Cl I	3
4598 ,49 4597 ,942	Kr II Cu II	50 5	4580 ,458	Ti II	1
4597,673	Cs II	10	4580 ,35 4580 ,11	Ne II Kr II	$\frac{3}{2}$
4596,903	Cu II	10	4579,346	Ar II	25
4596 ,30 4596 ,22	Xe II Cl III	1 4	4578,558	Ca I	30
4596 ,174	O II	8	4578,17	Cl I O I	$\frac{4}{3}$
4596,0964	Ar I	1000	4577,66 4577,20	Kr II	800
4595 ,65 4595 ,249	K II Ne I	5 50	4577,06 4576,79	Xe II O I	$\frac{200}{2}$
4593 ,70	Xe II	6	1		2
4593 ,3 4593 ,243	C III Ne I	1 50	4576,60 4576,1	Xe I F II	0
4593 ,172	Cs I	1000	4575,858	Ne I Kr II	20 1
4592 ,85 4592 ,80	F VI Kr II	$\frac{1}{150}$	4575 ,8 4575 ,0620	Ne I	300
, -			•		70

3	Symbol	ī	1	Symbol	
λ 4574,759 4574,49 4573,759 4573,357 4573,33 4573,066 4572,894 4572,611 4572,13 4571,971 4571,85 4571,786 4571,0956 4570,906 4569,69 4569,50 4569,42 4569,12	Symbol Si III Ne II Ne I Kr II Ne I Ar II Cs Cl II Ti II Xe II Mg I Ti I Ar I O III Cl II Xe II	20 1 30 50 30 5 2 10 100 50 30 4	\$\lambda\$ \[\begin{array}{c ccccccccccccccccccccccccccccccccccc	Symbol O V N I Si III N I N E II K II Si III N E I N II Ti I X E II N E I K I I I I I I I I I I I I I I I I I I	0 1 8 1 4 3 30 30 7 35 10 1 40 60 10 35
4569,01 4568,64 4568,5 4567,845 4567,823 4567,139 4566,983 4566,830 4565,82 4565,82 4565,51 4565,49 4564,9 4564,83 4564,82 4564,764 4564,415 4563,751	Ne II Ar I O IV Ne I Si III Ne I Cs II Ne I Kr II Kr III Kr III F I Ar I Ar II Ar II Ar II	5 2 	4547,8505 4547,760 4547,728 4547,34 4547,218 4546,36 4545,729 4545,23 4545,186 4545,045 4544,80 4544,746 4544,688 4544,502 4544,48 4544,41 4543,871 4543,71 4541,633	Fe I Ar II Ne I N III Ne I N III Ne I Xe II Na I Ar II Ti I Ne I Cl II Ar II Cs Na I	4 4 4 15 10 10 3 1 400 8 25 0 30 30 50 10 4 10 7
4563,427 4563,00 4562,637 4562,05 4561,018 4560,38 4559,920 4559,09 4556,698 4556,61 4555,94 4555,922 4555,890 4555,486 4555,392 4555,392 4555,30 4555,280 4555,069 4554,824 4554,561 4554,319	Ti I Xe II Ti I Ne II Ar II Kr II Fe III Ne I Kr II Cu II Fe II Ti I Ne I O III Cs I Ti I Ne I Ne I Ar I	5 2 6 1 3 3 6 6 6 2 200 200 100 8 30 0 2000 3 40	4541,60 4541,59 4541,032 4540,89 4540,380 4540,29 4540,207 4539,695 4539,25 4539,168 4538,942 4538,713 4538,942 4538,7683 4537,7545 4537,683 4537,648 4537,33 4537,25 4536,92 4536,78	Ar I He II Cu II Xe II Ne I Cu II Cl II Cu II Cu I Cu I Cl II Ne I Cs II Ar II Ne I Ar II Xe I I Xe III I I I I I I I I I I I I I I I I I	20 5 25 400 50 10 6 10 800 6 50 30 1 300 3 1000 300 7 30 6 80 20

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λ	Symbol	I	λ	Symbol	I
4536,46 4536,312 4536,051 4535,920 4535,574 4535,492 4535,47 4535,11 4534,782 4534,66 4534,64 4534,57 4534,34 4534,291 4533,966 4533,238 4532,500 4532,49 4532,395 4531,45 4532,61 4532,77 4532,76 4532,77 4532,76 4532,77 4532,76 4532,77 4532,76 4532,77 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71 4532,76 4532,71	Kr III Ne I Ti I Ti I Ti I Ar II Ne II N III Ti I Ar I Ne II Cs N III CI II Mg II Ti II Cs Xe II Ne I Cs Fe I N III N IV Ne I Al III N IV Ne I Al III Kr II Fe I N III Ti I Ca	10 150 40 40 50 6 3 2 60 20 2 10 3 5 6 30 80 10 200 1 15 8 1 800 7 9 00 	4520,225 4519,69 4519,19 4518,700 4518,64 4518,18 4518,022 4517,79 4517,526 4517,526 4516,936 4516,936 4516,77 4516,095 4516,050 4515,411 4515,337 4515,33 4515,022 4514,891 4514,89 4514,89 4514,89 4513,192 4512,734 4512,535 4512,282 4511,37 4512,535 4512,734 4512,535 4512,734 4512,734 4512,735 4512,734 4512,735 4512,736 4511,37 4511,29 4510,735 4510,735 4509,446 4509,97 4509,87 4509,374 4508,283 4507,557 4507,457 4507,457	Fe II Xe II Cl II Ti I Kr III N III Ti I Ne II Ne II Ar II Cu II Cu II Cs II Ne I Fe II Cu I Ti I Al III Ca I Xe II Ne II Ar II Ar I Cu I Cu I N III Ar I Cu I Cu I N III Ca I Cu I N III Ca I Cu I	7 3 18 8 2 3 50 2 100 3 2 50 6 1 5 5 10 30 7 3 2 70 7 2 50 40 8 5 2 20 4 2 6 1000 15 2 4 3 400 2 8 3 1 6 1 1 200
4523,33 4523,14 4522,846 4522,798 4522,66 4522,634 4522,36 4522,3238 4522,2	Cl III Kr II Cs II Ti I Ne II Fe II Cs	4 400 15 40 4 9 15 800	4507,11 4506,834 4506,705 4506,624 4506,50 4505,997 4505,33 4505,16 4505,00	O II	5 10 15 1 2 75 6 3 0
4521,86	Xe II	100	4504,27	Cl II	20

λ	Symbol	I	λ	Symbol	I
4503,762 4503,53 4503,46 4503,08 4502,931 4502,52 4502,3546 4502,27 4501,525 4501,270 4500,9772 4500,182 4499,843 4499,000 4498,94 4498,543 4497,709 4497,658 4497,45 4497,30 4496,758 4496,758 4496,758 4496,758 4496,758 4496,758 4496,758 4496,758 4496,146 4495,86 4494,67 4494,5669 4494,177 4494,048 4493,699 4493,660 4493,108 4492,412 4492,40 4492,412 4492,40 4492,412 4491,55 4491,771 4491,401 4491,25 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,05 4491,711 4491,401 4491,25 4491,05 4491,711 4491,401 4491,25 4491,711 4491,401 4491,25 4491,05 4491,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,401 4481,4	Ti I N I Xe III Ar II Ar II Ne II Kr I N I Cs II Ti II Xe I Ne I Ne I Ne I Ne I Ne I I I I I I I I I I I I I I I I I I I	4 1 10 1 7 0,5 600 2 25 40 500 50 5 2 5 7 3 11 1 18 15 20 	4484,225 4483,190 4482,884 4482,688 4482,2563 4482,1720 4482,02 4481,85 4481,810 4481,327 4481,261 4481,327 4480,86 4480,86 4480,823 4480,600 4480,350 4479,968 4479,92 4479,98 4479,98 4479,724 4479,31 4479,226 4478,83 4479,724 4479,31 4479,226 4478,83 4477,691 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,47 4476,08 4477,528 4477,528 4477,528 4477,759 4474,759 4474,759 4474,759 4474,72 4473,85 4472,4 4472,246 4472,043 4471,682 4471,52	Fe I Ne I Si III Ti I Fe I Fe I Cl II Kr II Ar II Mg II Ti I Mg II Ti I Cu I Al III N IV Al III Kr II Ar I CI I C	4 150 3 10 6 4 10 50 15 13 30 14 5 500 15 5 500 4 - 3 5 9 5 10 10 10 10 10 10 10 10 10 10
4488,319 4488,22 4488,17 4488,12 4488,0926	Ti II Kr II O II N II Ne I	15 3 2 2 300	4471,479 4471,238 4470,971 4470,90 4469,41 4469,380 4469,37	He I Ti I Ne I Xe II O II Fe I Cl I	1000 20 5 30 4 5 18
4488 ,09 4487 ,72 4485 ,95	O II O II Xe II	$\begin{array}{c} 2 \\ 0 \\ 20 \end{array}$	4469,32 4469,09 4468,91	O II Cs Ne II	3 2 5

λ	Symbol	I	λ	Symbol	I
4468 ,493	Ti II	50	4454 ,37	Kr II	10
4468,48	Cl II	2	4454,285	Ne I	5
4468,452	Si III	2	4453 ,9177	Kr I	600
4468 ,15	Xe III	1	4453,708	Ti I	$\overset{\circ}{20}$
4467 ,88	OII	4	4453 ,61	Xe III	8
4467,491	Ne I	1	4453,528	Ne I	.1
4467,31	CI	2	4453,44	Cs II	15
4466 ,8120	Ne I K II	70	4453,324	Ne I	2
4466,65 $4466,5542$	Fe I	${5\atop 12}$	4453,32	Cl II	3
-			4453,312	Ti I	30
4466,503	Ne I C I	$\frac{2}{5}$	4453,253 4453,21	Ne I Kr II	5 50
4466 ,48 4466 ,32	O II	$\frac{3}{2}$	H		
4466,28	ΟΪΙ	$ar{4}$	4452,983	Ne I	15
4466,045	Ne I	5	4452,55 4452,377	Ne II O II	$\frac{1}{6}$
4465,807	Ti I	20	4450,896	Ti I	$2\overline{5}$
4465,651	Ne I	50	4450,785	Čs II	2
4465,527	NII	2	4450 ,487	Ti II	10
4465,40	O II	4	4450,34	Kr II	4
4464 ,68	CI	2	4449,517	Ar II	4
4464,60	Xe II	1	4449,143	Ti I	30
4464,45	CI	2	4448 ,881	Ar II	8
4463,89	C I Kr I	2	4448,88	Ar I	3
4463 ,6901 4463 ,539	Ti I	800 8	4448,459	Ar II	3
			4448 ,21	O II	6
4463 ,391 4462 ,856	Ti I Ne I	$\frac{8}{2}$	4448,13	Xe II O III	500
4462,684	Cu II	$\ddot{3}$	4447 ,82 4447 ,8	Al II	$\frac{0}{3}$
4462,19	Xe II	1000	4447,7212	Fe I	9
4462,089	Ti I	3	4447,649	Cs E II	10 12
4461,6544	Fe I	8	4447 ,18 4447 ,033	F II N II	12
4461,56	OIII	1	4446,71	FII	10
4461,50	CI	1 5	li .		
4461,46	Ar I C I	5 1	4446,538	Ne I F II	$\frac{1}{6}$
4461,30			4446 ,51 4446 ,46	Ne II	3
4460,560	Ar II Ar I	12 10	4446,11	Cl I	4
,53, 4460 ,45, 4460	Kr II	10	4445 ,848	Ar II	8
4460,43	Ne I	100	4445,84	Ar I	5
4459,99	Kr II	8	4445,83	Cl I	4
4459,933	NII	3	4445,671	Ne I	1
185, 4459	Cs II	15	4444,978	Ne I	30
1213, 4459	Fe I	10	4444,823	Cu II	3
4458,885	Ar II Cs II	1 15	4444,004	Cs II	10
4457,680			4443,802	Ti II	50
4457,428	Ti I	40	4443,72	Kr II	3
4457,25	Kr II	40	4443,72 4443,28	Kr III Kr III	3 15
4456,95	Ne II Ca I	5 10			
4456 ,612 4456 ,61	Ar I	3	4443,20	Ti I	$\frac{3}{7}$
			4443,1963	Fe I	7 2
4456,55	Ar II	1	4443,08 4443,05	O II C III	5
4456 ,380 4455 887	Ne I Ca I	$\frac{1}{40}$	4442,67	Ne II	3
4455 ,887 4455 ,564	Ne I	15	1		
4455,321	Ti I	30	4442,3428	Fe I	12 6
		2	4442 ,018 4441 ,49	N II C IV	$\frac{6}{3}$
4455,00 4454,781	K II Ca I	80	4441,49	Ti I	4
4454 ,781 4454 ,3835	Fe I	5	4440,95	Xe II	50
110-1,0000	-		•		

			•			
	λ	Symbol	I	λ	Symbol	I
	4440,890 4440,363 4440,345 4440,326 4440,122 4440,1 4439,95 4439,463 4439,463 4438,488 4438,481 4436,551 4436,586 4436,586 4436,586 4436,586 4436,586 4436,586 4436,586 4436,586 4436,586 4436,586 4436,486 4436,586 4436,486 4436,486 4436,588 4436,486 4436,486 4436,486 4436,486 4436,588 4436,486 4436,486 4436,486 4436,486 4436,486 4436,486 4436,486 4437,708 4433,841 4433,7239 4433,841 4433,7239 4433,578 4433,775 4433,398 4433,475 4433,475 4433,475 4431,67 4431,67 4431,67 4431,67 4431,004 4430,90 4430,90 4430,90 4430,470 4430,470 4430,366	Ne I Ne I Ne I Ti I C IV Cs Ar II O III Ne II Ar II Ar II Ar II He I Cl I Ar II Mg II Ti I Mg II Cs II Ca I Si I O III Xe III Ye I I Ne I I Ti I Ne I I Ti I Ne I Ne I Ti I Ne I Ti I Ne I Ti I Ne I Ti I Ne II Ne II Ti I T	1 2 15 10 2 15 4 0 2 4 7 3 1 20 3 15 3 600 4 4 5 5 2 20 40 5 60 10 2 50 15 9 10 70 3 5 10 3 8 20 1 3 500 1 4 7 15 4 6 10 7	4427,755 4427,52 4427,3118 4427,236 4427,098 4426,054 4426,005 4425,49 4425,49 4425,400 4425,25 4425,1908 4424,046 4423,996 4423,556 4423,556 4423,246 4422,823 4422,5703 4422,5703 4422,5703 4422,5703 4422,5703 4422,5205 4421,754 4421,559 4421,38 4420,912 4420,558 4420,912 4420,558 4420,912 4420,558 4421,781 4417,81 4417,81 4417,718 4417,718 4417,30 4417,30 4417,30 4417,30 4417,31 4417,31 4417,31 4417,31 4417,31 4417,30 4417,30 4417,30 4417,31	Ne I Xe II Fe I N II Ti I Ti I Ti I Ar II Ti I Cs I Si I Ca I Ne I Xe III Kr I Ne I Cs II Ar I Kr II Fe I Ne I Ti I Ne I Ne II Ti I Ne I Ne II	30 2 10 5 40 10 25 3 10 50 150 150 10 80 300 10 80 3 4 7 10 100 6 300 6 50 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	4430,192 4430,023 4429,60 4429,410 4428,9	Ar II Ti I Ne II Ne I Kr II	20 3 2 1 1	4416, 535 4416, 07 4415, 54 4415, 141 4415, 1250	Ti I Xe II Cu I Ne I Fe I	4 150 200 5 20
	4428,9 4428,54 4427,994 4427,981 4427,964	Ne II Mg II Ne I N II	8 15 4	4414,909 4414,90 4414,84 4414,37 4413,561	O II Cl III Xe II O II Ne I	10 2 300 1 15
708						

λ	Symbol	I I	λ	Symbol	I
4413,255 4413,20 4412,905 4412,54 4412,39 4412,285	C II Ne II Ar II Ne II Kr I	1 4 3 2 6	4395,95 4395,848 4395,77 4395,76 4395,556 4395,306	O II Ti II Xe II Fe III Ne I Ne I	7 2 500 6 50
4411,652 4411,506 4411,163 4411,080 4410,3685	Si IV C II C II Ti II Kr I	0 7 6 15	4395,12 4395,031 4395,008 4394,773 4394,622	Xe III Ti II Ne I Ne I Ar II	4 60 1 15 3 15
4410,208 4409,979 4409,84 4409,620 4409,30 4409,161	Cs II C II Mg I Ne I Ne II C II	20 5 1 20 7 2	4394,370 4394,057 4393,925 4393,340 4393,20 4392,59	Ne I Ti II Ti I Na I Xe II Si I	2 8 9 500 10
4408,89 4408,4176 4407,7130 4406,88 4406,721	Kr II Fe I Fe I Xe II Si III	40 6 5 200 8	4391 ,94 4390 ,9542 4390 ,564 4390 ,38 4390 ,029	Ne II Fe I Mg II Cl I Na I	7 4 10 7 8
4406 ,469 4406 ,02 4405 ,901 4405 ,582 4405 ,351	Ar II O II Si III Ne I Si III	2 1 6 2 4 35	4389 ,76 4389 ,72 4388 ,90 4388 ,764 4388 ,411	Cl I Kr II Kr II Cs II Fe I	$25 \\ 20 \\ 3 \\ 10 \\ 4$
4405,253 4404,911 4404,903 4404,7525 4404,397 4404,33	Cs II Ti I Ar II Fe I Ti I Kr II	5 5 5 30 5 30	4388 ,16 4388 ,077 4388 ,016 4387 ,9294 4387 ,8959	K II Ti I C III He I Fe I	7 3 4 50 4
4404,276 4403,854 4403,734 4403,54 4403,03	Ti I Cs II Si IV Ti IV Cl I	10 20 2 2 2 15	4387 ,55 4387 ,52 4386 ,962 4386 ,858 4386 ,566	Cl I Xe III Ar II Ti II Cs II	6 4 1 10 2
4402,985 4402,58 4402,580 4402,374 4401,744	Ne I Cl I Ne I Ne I Ar II Ar II	1 4 1 2 2 2	4386 ,54 4385 ,7693 4385 ,381 4385 ,27 4385 ,058	Kr II Xe I Fe II Kr II Ar II	300 70 7 50 10
4400 ,988 4400 ,87 4400 ,099 4399 ,9670 4399 ,767 4399 ,495	Kr II Ar II Kr I Ti II Cs II	100 18 200 35 20 15	4385,00 4384,93 4384,637 4384,428 4384,08	Ne II Xe II Mg II Cs II Ne II	$\begin{array}{c} 2 \\ 60 \\ 9 \\ 25 \\ 1 \end{array}$
4399,39 4399,14 4398,136 4397,994 4397,94 4397,37	Kr II Cl II Ne I Cs Ne II Ti IV	15 15 5 10 6 2	4383,9092 4383,80 4383,754 4383,5473 4383,544	Xe I K II Ar II Fe I C III	100 1 8 45 2
4397 ,175 4397 ,0 4396 ,909 4395 ,969	Ne I Cu I Cs II Ne I	1 10 15 1	4382,934 4382,898 4381,52 4381,220 4380,76	Ar II C III Kr II Ne I Cu II	3 3 100 30 2

λ	Symbol	I	λ	Symbol	I
4380,57 4380,375 4380,11 4379,952 4379,90 4379,879	Cl III Mg I Kr I C III Cl I Ar II	2 6 2 2 20 5	4369,60 4369,52 4369,28 4369,20 4368,77 4368,36	Cl III Cl I O II Xe II Cs Ar I	2 15 4 200 10 5
4379,667 4379,55 4379,50 4379,481	Ar II O II Ne II C III	$\begin{array}{c} 20 \\ 3 \\ 6 \\ 2 \end{array}$	4368 ,30 4368 ,263 4368 ,047 4367 ,87	O I C II Ar I	10 4 1 10
4379,44 4379,226 4379,09 4378,68 4378,430	Xe II Ar II N III Kr III Cu II	10 3 10 8 8	4367,829 4367,66 4367,657 4367,5811 4367,50 4367,05 4366,896	Ar II Cs Ti II Fe I C III Xe II O II	10 10 15 5 3 30 7
4378,41 4378,20 4378,01 4377,95 4377,754	O II Cu I O II Ne II Ne I	0 550 0 2 2	4366 ,26 4365 ,72 4365 ,705	Kr II Ne II Ne I	6 2 1
4377,71 4377,626 4376,957 4376,562 4376,1219	Kr II Si III Si II C II Kr I	40 8 5 5 800	4365,362 4364,80 4364,79 4364,61 4364,59 4363,7957	Cu II Ar IV Cl III Kr II Al III Ar I Cs II	30 3 4 2 80 2
4375 ,948 4375 ,9318 4375 ,009 4374 ,997 4374 ,98	Ar II Fe I C II Ne I N II	12 9 4 2 2	4363,69 4363,524 4363,30 4363,275 4363,228	Ne I Cl I Cs II Ne I K II	70 20 50 2 3
4374 ,87 4374 ,857 4374 ,272 4373 ,78 4373 ,018	K II Ar II C II Xe II Cs II	1 6 9 100 30	4362 ,96 4362 ,690 4362 ,6424 4362 ,065 4361 ,87	Ne I Kr I Ar II C III	30 500 10 4
4372,91 4372,81 4372,491 4372,487 4372,46	Cl II Fe III Ar II C II Xe II	80 20 5 7 2	4360,63 4360,487 4360,32 4359,38 4359,02 4358,90	Kr III Ti I Xe II O II Cs C III	1 4 2 1 10
4372 ,383 4372 ,350 4372 ,287 4372 ,157 4371 ,796	Ti I C II Xe I Ne I Ne I	3 6 20 30 2	4358 ,816 4358 ,490 4358 ,40 4358 ,27	Ne I Ar II O II N I	2 2 3 0
4371,65 4371,55 4371,37 4371,329	O II Cl I C I Ar II	2 5 6 20	4357,918 4357,66 4357,298 4357,25 4357,2	Ne I Xe III Ne I O II	5 1 2 0
4371 ,25 4370 ,91 4370 ,751 4370 ,661 4369 ,857	Kr II Cl III Ar II C II C II	20 4 15 1 2	4356 ,821 4356 ,807 4356 ,711 4356 ,575	Al III Si III Al II Al II Cs II	4 1,5 2
4369,7745 4369,77 4369,69 4369,682	Fe I Ne II Kr II Ti I	7 5 200 5	4356 ,100 4355 ,525 4355 ,47 4355 ,41 4355 ,281	Si III Si III Kr II C I Si III	2 3 3000 1 3

λ	Symbol	I	λ	Symbol	I
4355,096 4354,74 4354,529 4354,23 4354,064 4354,03 4353,90 4353,73 4353,66 4352,810 4352,7371 4352,204 4351,974 4351,9056 4351,764 4351,3602 4351,269 4351,02 4349,55 4349,426 4348,97 4348,620 4348,36 4348,063 4347,802 4347,785 4347,425 4347,785 4347,425 4347,316 4347,223 4346,918 4346,918 4346,918 4346,918 4346,918 4346,918 4346,918 4346,918 4346,918 4346,12 4346,104 4346,036 4345,762 4345,762 4345,762 4345,762 4345,767 4344,736 4344,736 4344,736 4344,291 4344,291 4344,291 4344,291 4344,291 4344,291 4344,291 4344,291 4344,291	Ca I Cu I Mg I Kr I Ti I Cl III Kr I Cl III N III O II Si III Fe I Ar II Si III Kr I O II Kr II O II Kr II O II Kr II O II Kr II O II Cs II N III Al II C I Ti I Ne I Ne I O II C I Ti II Kr III C I	25 10 6 2 3 2 2 2 1 2 9 15 2 100 6 40 2 8 1 2 5 50 3,5 6 1,5 2 1000 5 1 2 8 0	4340,468 4340,420 4340,36 4340,256 4340,03 4339,78 4339,52 4338,893 4338,67 4338,501 4338,228 4338,200 4337,916 4337,070 4337,070 4337,070 4337,070 4336,48 4336,26 4336,221 4336,221 4336,30 4335,411 4335,3381 4334,29 4334,1267 4334,0 4333,5612 4334,0 4333,5612 4333,34 4332,80 4332,76 4332,031 4331,945 4331,945 4331,199 4331,13 4330,52 4330,44 4330,239	H Ne I O II Ne I K II Ne II N III D T He II Si III Ar II Ti II Cl I Ar II Xe II Ne I Cu I Xe II Ne I	200 2 2 2 5 1 3 200 200 3 9 2 50 1 8 30 10 6 5 45 50 10 10 4 8 800 0 70 1000 50 9 115 32 0 1000 1
4343,62 4343,41 4343,36 4342,83	Cl II N I O II O II	100 1 0 1	4330,14 4328,68 4328,62 4328,175	N III Cu I O II Si IV	$\begin{array}{c} 2 \\ 20 \\ 2 \\ 5 \end{array}$
4342,56 4342,40 4342,00 4341,64 4341,489 4341,47 4341,42 4341,400 4341,33	Xe II C I O II C I Na I Cl III Ne II Si III Kr II	6 0 4 2 4 2 2 8 8	4328,15 4327,89 4327,580 4327,48 4327,265 4327,098 4326,359 4326,315 4326,156 4326,12 4325,827	N III O II Cs II O II Ne I Fe I Ti I Cs C II Cl I	$ \begin{array}{r} 3 \\ 0 \\ 10 \\ 3 \\ 10 \\ 3 \\ 9 \\ 10 \\ 5 \\ \hline 4 \end{array} $

λ	Symbol	I	λ	Symbol .	I
4325 ,77 4325 ,7647 4325 ,7 4325 ,560	O II Fe I Li II C III	3 35 3 8	4310 ,36 4310 ,130 4309 ,3771 4309 ,33	Fe III Ne I Fe I Xe III	12 2 4 6
4325 ,15 4325 ,134 4324 ,66	Ne II Ti I Cl III	1 9 2	4309,236 4309,236 4309,10 4309,090	Ar II K II Ar II	9 7 8
4324,615 4323,93 4323,35	Na I N III Cl I	$\begin{bmatrix} 7\\2\\20 \end{bmatrix}$	4309,06 4308,96	Cl II	50 1
4323,102 4322,98 4322,66	C II Kr II Ne II	${f 150} \\ {f 1}$	4308 ,42 4308 ,00 4307 ,942	Cl III Xe III Cs II	1 10 8
4322 ,26 4321 ,99	Ne II N I	$\frac{2}{1}$	4307 ,9048 4307 ,900 4307 ,741	Fe I Ti II Ca I	35 40 45
4321 ,82 4321 ,655 4321 ,647 4321 ,492	Xe II Ti I C II Ne I	40 8 3 2	4307 ,59 4307 ,42 4307 ,31	O II CI II C II	$egin{array}{c} 2 \\ 75 \\ 1 \end{array}$
4321 ,400 4321 ,37 4319 ,93	Na I N III O II	6 1 1	4307 ,20 4306 ,48 4306 ,33	Al II Cs II C II	$\frac{3}{10}$
4319,636 4319,636 4319,5798	Ar II O II Kr I	$\frac{1}{2}$ 8 1000	4306 ,2625 4306 ,21 4305 ,910	Ne I Xe II Ti I	70 1 60
4319 ,511 4319 ,12 4318 ,834	Ne I Kr II Ne I	1 4 5	4305 ,86 4305 ,81 4305 ,53	Xe III Kr II O II	$\begin{array}{c} 2\\ 3\\ 0 \end{array}$
4318 ,652 4318 ,631	Ca I Ti I	45 10	4305 ,46 4305 ,265 4305 ,20	N I K II Kr III	6 1 9
4318,600 4318,5523 4317,85 4317,81	C II Kr I K II Kr II	5 400 2 500	4305,00 4304,77	K II Fe III	7 10
4317,70 4317,65	N I O II	5 0	4304,07 4303,955 4303,82	Cl II Ne I O II Ne I	40 5 5 1
4317 ,260 4317 ,139 4316 ,992 4316 ,008	C II O II Cs II Ne I	8 8 2 15	4303 ,695 4303 ,248 4303 ,166	Ne I Fe II	30 8
4315 ,80 4315 ,44 4315 ,44 4315 ,35	O II O II	00 3 0	4303,06 4302,81 4302,527 4302,4455	O II O II Ca I Kr I	0 0 60 10
4315 ,0872 4314 ,979 4314 ,801	Fe I Ti II Ti I	10 40 25	4301 ,928 4301 ,53 4301 ,089	Ti II Kr II Ti I	15 40
4314,74 4314,695 4314,356	Ti l Ne I Ti I	25 30 5	4300 ,650 4300 ,636	Ar II Cs II	50 12 30
4314 ,110 4314 ,104	Ne I Si IV	1 3	4300 ,566 4300 ,49 4300 ,4877	Ti I Kr II Kr I	50 200 50
4313 ,43 4313 ,11 4313 ,100 4312 ,861	O II N I C II Ti II	1 4 6 35	4300 ,449 4300 ,1011 4300 ,052	Ar II Ar I Ti II	2 1200 60
4312,301 4312,10 4310,51 4310,47	O II XeII Ar I	0 500 20	4299 ,636 4299 ,2409 4299 ,24 4299 ,229	Ti I Fe I Ar I Ti I	15 18 5 15

λ	Symbol	I	λ	Symbol	I
4299 ,177 4298 ,986	F II Ca I	10 30	4286 ,006 4285 ,89	Ti I Xe III	25 30
4298 ,664	Ti I	40	4285,704	CII	3
4298 ,040 4297 ,964	Fe I Ar II	3 7	4285,70	OII	$\frac{3}{3}$
4297,514	Cs Cl III	10	4285 ,4453 4285 ,40	Fe I Kr II	3 4
4297 ,04 4296 ,85	Fe III	0 10	4285 ,239	Cu II	10
4296,75	Xe II Fe II	$\frac{2}{6}$	4284,988 4284,92	Ti I N I	$\frac{8}{2}$
4296 ,567 4296 ,40	Xe II	500	4284 ,89	KII	3 1
4295,920	CII	4	4284 ,51 4284 ,229	N III Cs II	$\overset{1}{2}$
4295,751 $4295,21$	Ti I Kr II	22 8	4283 ,75	O II	0
4294,97	Ar I	20	4283 ,242 4283 ,13	Ne I O II	$ \begin{array}{c} 10 \\ 0 \end{array} $
4294 ,83 4294 ,82	Kr III O II	$\frac{10}{3}$	4283,010	Ca I	40
4294,76	N III	0	4282 ,9686 4282 ,96	Kr I O II	100 1
4294 ,1271 4294 ,101	Fe I Ti II	15 10	4282 ,896	Ar II	12
4292 ,92	KrII	600	4282 ,82 4282 .702	O II Ti I	$egin{matrix} 0 \ 12 \end{smallmatrix}$
4292,64	Kr I	6	4282,59	Cs	10 4
$4292,469 \\ 4292,23$	Cu II O II	$\begin{array}{c} 30 \\ 0 \end{array}$	4282,46	Cl III	
4292,008	Cs II	12	4282 ,4057 4282 ,20	Fe I N I	$\frac{12}{1}$
4291,976	Ne I C II	$\begin{bmatrix} 2 \\ 3 \end{bmatrix}$	4281,40	O II	0
4291 ,819 4291 ,76	Cl II	50	4281 ,39 4281 ,371	N I Ti I	$\frac{2}{10}$
4291 ,25 4291 ,214	O II Ti I	1 5	4281,31	Cs	10
4291,214	Cu II	2	4281 ,25 4280 ,61	O II Kr II	0 5
4291,006	Na I	3	4280,43	Cl I	2
4290 ,933 4290 ,80	Ti I N III	$\frac{22}{3}$	4279 ,959 4279 ,909	Cu II Ar II	$\frac{20}{2}$
4290,78	Kr I	4	4279 ,279	Ne I	15
4290,55	N III	1 6	4278 ,89 4278 ,850	F II Ne I	4 5
$4290,40 \\ 4290,222$	Ne II Ti II	50	4278, 829	Ti I Ti I	3 7
4289 ,919 4289 ,876	Ti I C II	$\frac{3}{2}$	4278 ,231		
4289,799	Ne I	$\frac{5}{2}$	4277 ,90 4277 ,524	O II Ar II	$\frac{1}{20}$
4289,364	Ca I	40	4277 ,51	F II O II	6 1
4289 ,09 4289 ,068	Ar I Ti I	$\begin{array}{c} 5 \\ 25 \end{array}$	4277 ,40 4277 ,100	Cs II	$5\overset{1}{0}$
4288 ,83	O II N III	1	4276 ,787	Na I	5
4288 ,72			4276,71	O II	$\frac{1}{3}$
4288 ,70 4288 ,541	K II Ne I	4 5	4276 ,64 4276 ,51	Cl II	30
4288,350	Cs II	35	4276 ,441	Ti I	8
4288 ,21 4288 ,161	N III Ti I	$\frac{0}{3}$	4276,21	O II	$\stackrel{30}{0}$
4288,02	Kr I	5	4276 ,044 4275 ,90	Cu II O II	$\frac{30}{0}$
4287,893	Ti II	2	4275 ,5598	Ne I O II	70 4
4287 ,838 4287 ,45	Na I Kr II	$\frac{2}{4}$	4275,52		
4287,405	Ti I	$2\overline{2}$	4275 ,21 4275 ,167	F II Ne I	8 1
4286 ,4875	Kr I	40	4275 ,158	Ar II	8
4286,343	Ar II Fe III	$\frac{2}{10}$	4275 ,107 4274 ,656	Cu I Ne I	950 50

λ	Symbol	I	λ	Symbol	I
4274,58 4274,13 4274,13 4273,97 4273.64 4273,48 4273,10 4272,87 4272,60 4272,44 4272,16 4271,84 4271,76	O II Xe III 00 Kr I 2 Na I Kr II O II 7 Li I 7 Cs Xe III 0 Ti I 90 Ar I Cs II	15 00 1 1000 4 4 4 0 10 10 20 8 1200 10 35	4258,523 4257,894 4257,82 4257,54 4257,25 4256,663 4256,498 4256,455 4256,025 4255,600 4255,59 4255,42	Ti I C III Ne II CI II Ne II Ar II Ne I C III Ti I Ar II Cu II C III	4 2 3 4 1 1 2 1 8 4 3 1
4271,47 4271,24 4271,45 4270,61 4270,26 4270,13 4269,84 4269,72 4269,02 4268,89	Fe III Ar I 89 Fe I CI II 7 Ne I 9 Ti I Xe II 4 Ne I C I	$ \begin{array}{r} 6 \\ 5 \\ 20 \\ 25 \\ 50 \\ 7 \\ 40 \\ 70 \\ 6 \\ 10 \\ \end{array} $	4254,95 4254,85 4254,7 4253,98 4253,74 4253,51 4253,390 4253,28 4252,775 4252,67	Ar I Kr II N I O II O II CI II Cu I N I Ne I Kr II	10 100 4 4 4 75 20 4 2 50
4268,81 4268,57 4268,009 4267,83 4267,73 4267,72- 4267,499 4267,280	Kr II Kr II 9 Ne I Fe I 0 Ar II 4 Ne I 0 Ar II 6 Ne I	1000 60 70 5 3 5 3 1 20	4252,520 4252,418 4251,618 4251,57 4251,1850 4250,7896 4250,68 4250,58	Na I Ne I Ti I Xe II Ar I Fe I Ne II Kr II	2 2 3 100 800 25 4 150
4267,204 4267,003 4266,526 4266,286 4266,227 4265,723 4265,52 4265,273 4264,67	3 C II 8 Ar II 68 Ar I 7 Ti I 3 Ti I Ar I 3 Ti I	2 18 25 1200 3 4 2 3 50	4250,41 4250,1248 4249,95 4249,538 4249,410 4249,37 4249,114 4248,956	Ar I Fe I Fe III Ne I Na I Ar I Ti I	3 25 7 2 1 20 5
4264,59 4263,57 4263,44 4263,40 4263,288 4263,134 4262,479 4262,3	CI I Xe II Xe II K II Kr I Ti I We I O IV	5 5 30 7 20 15	4248,2275 4247,433 4247,31 4247,308 4247,20 4246,16 4245,38 4245,2594 4244,41	Fe I Fe I N II C III N II F II Xe II Fe I Xe II	4 12 1 4 1 15 500 6 30
4261,609 4261,22 4260,85 4260,479 4259,739 4259,52 4259,44 4259,401	Cl II Kr II 94 Fe I 9 Ne I Cl II Kr II	5 20 5 35 1 35 80 150	4244,33 4244,17 4243,88 4243,85 4243,640 4243,57 4243,35	Kr III Ne II Xe II Fe III Ar II Ar I	5 0 10 8 2 20 2
4259 ,364 4259 ,202 4258 ,59		1200 5 5	4242,543 4242,489 4242,445	Mg II N II Mg II	2 3 3

<u> </u>					1
λ	Symbol	I	λ	Symbol	I
4242,26 4242,20 4242,082 4241,973 4241,784 4241,38 4241,240 4240,75 4240,456 4240,24 4239,95 4239,448 4238,987 4238,821 4238,821 4238,25 4237,889 4237,223 4237,05 4236,91 4236,64 4235,9433 4235,82 4235,54 4235,49 4234,408 4234,09 4233,86 4233,72 4233,6089 4233,6089 4233,6089 4233,6089 4233,60 4233,32 4233,168 4232,864 4232,82 4232,866 4232,323 4232,188 4231,60 4230,9 4230,444 4230,35 4229,872 4229,81 4229,59	Cu I Ne II Na I Cs II N II Cl II N II Cl II N II Ca I Xe III Cu II Na I Fe I Xe II Ti I Ar II N II Fe I Xe III Fe II Cl	30 1 30 1 3 10 10 60 3 6 10 2 2 00 25 2 10 500 7 12 7 8 100 25 1 10 25 2 10 50 3 1 10 25 2 10 25 2 10 25 2 10 25 2 10 25 2 10 25 2 10 25 2 10 25 26 27 10 27 10 27 10 27 10 27 10 27 10 27 10 10 27 10 10 27 10 10 10 10 10 10 10 10 10 10	4227 ,28 4226 ,988 4226 ,812 4226 ,728 4226 ,607 4226 ,58 4226 ,44 4225 ,92 4225 ,465 4225 ,12 4224 ,795 4224 ,795 4224 ,776 4223 ,36 4223 ,16 4223 ,04 4223 ,00 4222 ,97 4222 ,97 4222 ,80 4222 ,47 4222 ,39 4222 ,2181 4222 ,20 4221 ,80 4221 ,119 4220 ,92 4221 ,119 4220 ,79 4220 ,79 4220 ,79 4220 ,79 4220 ,79 4220 ,79 4219 ,516 4219 ,516 4219 ,3641 4218 ,88 4218 ,76 4218 ,88 4218 ,76 4218 ,88 4217 ,433 4217 ,433	Cs II Ar II Al II Ca I Ar II Kr III Kr III Kr III Kr III Kr III Fe I F II Cl II Ti I Ne II Fe I C I N I Xe II Kr II Kr II CI II Ti I Ne II CI II Fe I Kr II CI II Fe I Kr II CI II Ne I CS II Ne II CS II Ne II CS II Ne II Ne II CS II Ne II	5 10 6 500 5 25 15 20 7 6 4 15 5 4 16 3 4 5 4 10 3 8 12 20 3 1 15 22 2 2 5 6 5 12 2 2 3 4 4 1 2 2 2 3 4 4 1 4 2 2 2 3 4 4 4 4 4 4 4 5 2 2 2 2 2 2 3 4 4 4 4 4 4 5 2 2 2 2 2 2 2 3 4 4 4 4 4 5 2 2 2 2 2 2 2 2 3 4 4 4 4 5 4 5 2 2 2 2 2 2 3 4 4 4 4 5 4 5 2 2 2 2 3 4 4 4 5 2 2 2 2 2 2 3 4 4 4 5 4 5 2 2 2 2 2 2 2 2 3 4 4 5 4 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 3 4 3 4 5 2 2 2 2 2 2 2 2 2 3 3 3 4 3 4 3 3 3 3 2 2 2 3 3 3 3
4229,21 4228,79 4228,33 4228,162 4227,982 4227,936	Kr II Kr II C I Ar II Al II	8 20 5 20 4 30	4217,09 4216,89 4216,75 4216,1854 4215,92 4215,69 4215,60 4215,55	O I Cu II Xe III Fe I N I N III Xe II Ti III	4 3 10 8 2 3 200 5
4227,923 4227,743 4227,654 4227,493 4227,432 4227,406 4227,37	Al II N II Ti I Al II Fe I Al II Cl II	1,5 8 5 5 30 2 4	4214,854 4214,73 4214,69 4214,04 4213,72 4213,650 4213,2	Ar II N I Xe II Xe III Xe II Fe I O V	2 5 6 20 400 5

		1	. <u> </u>		1
λ	Symbol	I	λ	Symbol	I
4213,129 4213,07 4212,694 4212,497 4212,407 4212,33 4211,861 4211,82 4211,729 4211,679	Cs II C I Ne I Mg I Si IV C I Cu II C I Ti I Si III	30 2 20 2 7 4 30 2 4 2	4201,42 4201,35 4201,25 4200,898 4200,752 4200,6746 4200,657 4200,38 4200,11 4200,06	Kr II N II Xe II Si II Ti I Ar I Si II Fe III Ti III	30 1 15 40 6 1200 30 6 2 6
4211,61 4211,12 4210,950 4210,87 4210,67 4210,3497 4209,944 4209,91 4209,71	C I C I Ar II Fe III Kr II Fe I Ar II C I	1 2 1 10 25 15 1 0	4200,02 4199,980 4199,892 4199,87 4199,0981 4199,00 4198,83 4198,3176 4198,3098 4198,3	N III N II Ar II He II Fe I Al III Ar III Ar I Fe I Na I	6 5 6 2 20 0,5 3 1200 20 10
4209,68 4209,62 4209,49 4209,47 4209,09 4209,05 4208,615 4208,48 4208,03	Cl I Xe III K II Xe II N II N I Fe I Xe II Cl II	12 10 4 200 0 1 3 400 30	4198,133 4198,099 4197,81 4196,72 4196,415 4196,26 4196,214 4195,974	Si II Ne I Xe II O II Ne I O II Fe I	50 70 10 1 15 00 4
4207,87 4207,54 4207,50 4207,442 4207,162 4206,6985 4206,51 4206,43	FII Ti III N II F II F II Fe I N II Ne II	2 3 3 5 7 3 2 2	4195,91 4195,70 4195,337 4195,11 4194,88 4193,5296 4193,49 4193,482	Kr III N III Fe I Cl II Xe III Xe I N I Mg II	5 18 5 18 5 150 3 2
4206,29 4206,175 4206,11 4205,65 4205,404 4205,096 4205,07 4204,95	N I Ca II N II N I Xe I Mg I Cl II Ti III	1 4 1 2 10 2 10 2	4193,198 4193,15 4193,01 4192,62 4192,50 4192,24 4191,59 4191,4358	Cs II Xe II Xe I F II O II Cl II Fe I	8 500 20 2 2 6 15 15
4204,54 4204,31 4203,9867 4203,92 4203,6945 4203,465 4203,410 4203,270	Cl II Kr II Fe I Xe III Xe I Ti I Ar II Ne I	18 3 10 10 50 8 11 2	4191,0288 4190,724 4190,7138 4190,29 4189,788 4189,653 4189,10	Ar I Si II Ar I Ti II O II Ar II Fe III	1200 100 600 1 10 10
4203,22 4202,40 4202,0320 4201,971 4201,551	Xe II Al II Fe I Ar II Ar II	5 2 30 12 4	4188,88 4188,82 4188,694 4187,8015 4187,137 4187,06	Al III Cl II Ti I Fe I Si II Cl II	0,5 15 5 20 5 2

					<u> </u>
λ	Symbol	I	λ	Symbol	ſ
4187,06 4187,0436 4186,900 4186,63 4186,249 4186,419 4185,61 4185,456 4185,12 4184,8941 4184,89 4184,59 4184,4726 4183,345 4183,294 4182,97 4182,60 4181,8837 4181,7571 4181,10 4181,05 4180,86 4180,10 4179,674 4179,674 4179,674 4179,674 4179,58 4179,512 4179,302 4178,86 4178,855 4178,371 4178,2 4177,758 4177,758 4177,758 4177,758 4177,7595 4177,02 4176,53 4176,53 4176,33 4176,161 4175,6386 4175,488	Symbol N I Fe I C III CI II CS II K II TI I CI II O II Kr II Fe I CI II Kr III Kr I SI II TI I Ar IV N IV Ar I Fe I N II CI II TI I Xe II N II CU II Kr II CU II Kr II CU II Kr II O V CU I Fe I Mg I Kr II Fe I Xe III N II Fe I N II N	1 20 9 5 5 5 8 25 20 8 50 10 4 — 1000 15 2 20 30 12 0 8 12 — 1000 4 2 3 7 20 20 8 5 10 40 40 40 40 40 40 40 40 40 40 40 40 40	4172,51 4171,897 4171,858 4171,79 4171,607 4171,018 4170,99 4170,66 4169,38 4169,330 4169,230 4168,967 4168,70 4168,424 4168,41 4167,66 4167,28 4167,2712 4166,95 4166,84 4166,64 4166,64 4166,64 4166,64 4166,64 4166,40 4166,91 4166,091 4165,101 4164,802 4164,73 4164,88 4164,288 4164,73 4164,48 4163,26 4163,243 4163,82 4163,644 4163,26 4163,243 4162,86 4163,243 4162,86 4162,296 4161,14 4160,50 4160,263	Symbol Kr II Ti II Cu II Kr III N II Ti I Xe II Cl II N II Ti I O II Ar II He I Ar I Ar I Ar I Xe III Kr I Mg I C I II N I Ti I Cl II Ne I Mg I C I II Ne I Mg I No I Ti I Cu II Ar I Cu II Ar I Ti I Cu II Ar I Ti I Cu II Ar I Ti II Cu III Al II	20 30 25 15 6 8 8 8 1 7 4 4 3 3 1 5 15 1 9 1 6 4 30 4 50 20 20 1000 4 2 15 7 8 8 6 8 6 9 10 10 10 10 10 10 10 10 10 10 10 10 10
4175,40 4175,223 4174,9137 4174,472 4174,369 4174,27 4174,088 4173,966 4173.69	Ar I Ne I Fe I Ti I Ne I Fe III Ti II Ne I Ar 1II N IV	10 60 5 3 70 10 2 2	4160,239 4160,21 4159,809 4159,725 4159,634 4159,450 4159,00 4158,76 4158,798 4158,610	Al II Kr III Al II Al II Ti I Al II Kr II O V Fe I Cs II	2,5 4 1 1,5 9 1 4 0 5
4173,67 4173,572 4173,533 4173,450 4173,089 4172,83	N II Cs Fe 1I C III Kr I	3 15 8 2 3	4158,5906 4158,04 4157,98 4157,82 4157,791	Ar I Xe II Cl II Cl II Fe I	1200 200 5 25 8

λ	Symbol	I	λ	Symbol	I
4157,01 4156,8021 4156,76 4156,54 4156,49 4156,39 4156,3 4156,17 4156,15 4156,090 4154,98 4154,812 4154,77 4154,65 4154,5021 4154,46 4153,98 4153,910 4153,623 4153,37 4153,302 4153,2 4152,54 4152,512 4152,54 4152,512 4152,54 4152,512 4152,03 4151,46 4151,267 4150,963 4150,67 4150,963 4150,67 4150,138 4149,917 4149,897 4149,897 4149,897 4149,370 4149,19 4149,03 4148,4 4148,19 4147,98 4147,98 4147,98 4147,6719	N II Fe I C III O II C III N II Li II Xe II CI II Ar II Fe I N II Xe III Fe I N II Xe III CI II Fe I CI II TI T	3 12 2 3 6 1 1 1 2 7 12 8 9 2 12 40 2 10 10 0 7 20 5 5 12 20 10 3 3 8 1 10 5 7 3 - 11 10	4143,4174 4143,4 4143,4 4143,280 4143,048 4143,020 4142,24 4142,15 4142,08 4142,01 4141,296 4141,296 4141,25 4140,74 4140,48 4140,21 4139,35 4139,11 4139,00 4138,81 4137,96 4137,76 4137,63 4137,86 4137,76 4137,86 4137,86 4137,86 4137,86 4133,68 4133,68 4133,672 4134,6798 4134,31 4133,68 4133,672 4133,66 4133,66 4133,672 4133,66 4133,65 4132,806 4132,806 4132,62	Fe I N I Ti I Ti I Cl II Cu II O II Al III O II Xe III O II Fe III Al III Fe III Kr II Fe III N I Ti I Fe I Kr II Fe I Cl II Kr II Cl II Kr II Cl II Kr II Cl II	15 -3 7 5 5 0 2 1 10 1 20 0 6 2 8 100 1 3 50 10 7 10 7 -3 20 7 12 4 5 5 2 3 8 6 6 7 7 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8
			4132,598 4132,48 4132,42 4132,0603 4132,003 4131,782	Li I Cl II Xe III Fe I Cs II N II	50 200 3 25 10 4
4146,76 4146,26 4146,09 4145,78 4145,776 4145,73 4145,12 4144,240	Ar III C I O II O II N I N II Xe III Kr II Ar II	3 0 2 6 100 250 1	4131 ,730 4131 ,359 4131 ,33 4131 ,244 4131 ,054 4131 ,01 4130 ,893 4130 ,86	Ar II Cu II Kr III Ti I Ne I Xe II Si II Cl II	15 35 40 4 70 20 500 25
4143,8703 4143,77 4143,761 4143,52	Fe I O II He I O II	30 2 10 1	4130 ,512 4130 ,22 4129 ,693 4129 ,34 4129 ,16	Ne I Cl II Ar II O II N I	20 8 4 2 1

λ	Symbol	I	λ	Symbol	I
4128,643	Ar II	9	4112,885	Ne I	10
4128,072	Ne I	30	4112,819	Ar II	8
4128,067	Si II	300	4112,734	F II	4
4127 ,6113	Fe I	7	4112,708	Ti I	20
4127 ,531	Ti I	15	4112,34	Xe III	1
4127 ,19	Ar III	4	4112,14	K II	4
4126 ,96	F II	$\frac{2}{2}$	4112,14	Xe II	30
4126 ,941	Ne I		4112,100	Ne I	15
4125 ,96	Cl II		4112,029	O II	4
4125,4	O V		4111 ,882	Ne I	1
4124,078	N 11		4111 ,512	Si III	3
4124,058	Ar 11		4111 ,4	Cu I	3
4124,00	Cl II	12	4111 ,255	Si III	$\begin{array}{c}2\\2\\3\end{array}$
4124,00	Cl III	1	4110 ,83	N II	
4123,90	O V	2	4110 ,795	O II	
4123 ,559 4123 ,287 4123 ,287	Ti I Ti I Cu I	10 5 30	4110,41 4110,279	Xe II Ca II	30
4123,069 4122,78 4122,143	Na II Fe III Ti I	3 8 10	4110,20 4110,16 4110,06 4110,04	O II Kr II Xe III N II	1 5 10 3
4122,02 4121,86 4121,843	Fe III Xe II C III	8 5 5 5	4109,959 4109,816	N 1 Ca II	12 6
4121,8050 4121,74 4121,7	Fe I Cu I O V	5 10 —	4109 ,8053 4109 ,7093 4109 ,54 4109 ,23	Fe I Xe I Mg II Kr II	9 60 3 100
4121,48 4121,210 4120,90	O II Cs II Fe III	4 15 8	4109 ,173 4109 ,07	F II Xe III	8 100
4120,815	He I	$\begin{array}{c} 60 \\ 2 \\ 3 \end{array}$	4108,75	O II	0
4120,554	O II		4108,554	Ca I	10
4120,279	O II		4108,43	Kr I	3
4119,288	Cs II	8	4108 ,232	Cs II	5
4119,221	O II	8	4107 ,4917	Fe I	12
4119,219	F II	7	4107 ,07	O 1I	1
4119,2	Õ V		4106,83	O II	5
4118,84	Cl II		4106,03	O II	0
4118,756	F II		4105,000	Cl III	7
4118,5484	Fe I	15	4104,95	Xe II	40
4118,14	Kr II	30	4104,78	Cl I	3
4118,10	Ne II	0	4104,743	O II	5
4117,008	F 1I	5	4104 ,23	Cl III	5
4116,547	F II	7	4104 ,218	Cu I	25
4116,377	Ar II	6	4103 ,913	Ar II	20
4116,1151 4116,097 4115,504	Xe I Si IV Si III	80 9 5	4103,871 4103,724 4103,525	FII FII FII	7 7 7 15
4114,99 4114,95	K II Na II	6 3	4103 ,37 4103 ,217	N III F II Xe II	9 5 8
4114,487 4114,36 4113,972	Ar II N II N I O II	2 0 6 1	4103,10 4103,085 4103,017	F II O II	10 5
4113,82 4113,73 4113,52	Kr II Xe II	8 2	4102,9359 4102,422 4102,18	Si I Si III N I	$\begin{array}{c} 70 \\ 8 \\ 2 \\ 1 \end{array}$
4113,26	Xe II [.]	2	4102 ,01	Cs II	5
4112,975	F II	5	4101 ,86	Si III	7

λ	Symbol	I	λ	Symbol	I
4101,737 4100,97 4100,621 4100,34 4100,30 4100,249 4100,04 4099,951 4099,77 4099,71 4099,458 4099,166 4098,89 4098,77 4098,72 4098,533 4098,27 4098,187 4097,31 4097,31 4097,31 4097,31 4097,31 4097,138 4097,102 4096,58 4097,102 4096,58 4096,543 4096,543 4096,543 4096,543 4096,543 4096,543 4096,543 4096,543 4096,543 4096,58 4096,543 4096,58 4096,58 4096,58 4096,58 4096,58 4096,58 4096,58 4096,58 4097,102 4098,904 4098,907 4088,854 4088,33 4087,60 4087,00 4086,90 4086,69	H Xe II D Xe II Ne II T He II N I Mg I Kr II Ar II Ti I Xe II Ne II Kr II Ca I O II Ar III Fe I Kr I N II O II Ar II O II Ar II O II Ar II Ca I O II Kr II O II CI II N II O II CI III	100 100 20 1 100 20 1 100 2 9 2 3 2 8 100 4 250 15 0 4 4 1 10 -4 1 3 5 0 4 1 1 0 1 5 0 1 5 0 1 5 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0	4082,40 4082,393 4082,270 4081,833 4081,74 4081,471 4081,40 4081,10 4081,00 4080,686 4080,645 4080,534 4080,48 4079,88 4079,708 4079,708 4079,582 4079,359 4078,822 4078,827 4078,471 4077,93 4077,778 4077,625 4077,143 4076,939 4076,939 4076,939 4076,939 4076,83 4076,83 4076,83 4076,781 4076,638 4076,637 4076,526 4076,370 4076,251 4076,370 4076,251 4075,868 4075,851 4075,851 4075,851 4075,395 4074,845 4074,518 4074,518 4074,518 4074,518 4074,518	C I Ar II N II Mg I Ca III Cs Kr II O III Fe III Ar II Ar II Cu I Ne I Cl II Ti I Ar II C II C II C II Ti I C II C	1 1 15 5 2 5 10 1 1 7 4 6 15 2 50 15 6 12 2 4 100 30 4 4 2 4 9 3 0 15 12 8 4 4 3 5 10 12 50 4 3 8 10 15 8
4085,324 4085,124 4084,66 4084,499 4083,919 4083,907 4083,16	Fe I O II O II Fe I F II O II C I	4 3 1 6 6 2 1	4073,33 4073,224 4073,042 4072,711 4072,64	C I Cu I N II Si II C I Ar II	1 20 6 3 3
4082,98 4082,89 4082,456	C I N II Ti I	1 1 20	4072,164 4072,10 4072,006 4071,7399	O II Xe II Ar II Fe I	8 6 25 40

λ	Symbol	I	λ	Symbol	I
4071,20 4070,97 4070,789 4070,261 4069,897 4069,634 4069,53 4069,389 4068,981 4068,912 4068,835 4068,773 4068,144 4068,090 4067,982 4067,958 4067,958 4067,958 4067,940 4067,37 4066,979 4066,75 4066,328 4066,09 4065,25 4065,11 4065,094 4065,094 4065,094 4064,27 4064,23 4064,113 4064,036 4063,5963 4063,58 4063,5963 4062,90 4062,90 4062,4440 4062,4440 4062,4440 4062,4440 4062,4440 4062,4440 4060,98 4060,88 4060,88 4060,88	O II C I Ar II C III O II O II O II Cu I Ne I Ne I Ti I C III Ne I Cs II Ti I Cu II Fe I Cs II Kr III Fe I C I Fe II Kr II C I I Ti I C I I Ti I C I I Ti I C I I Fe II Kr II C I I Fe II Kr II C I I Fe II Kr II C I I Ti I I	0 22 29 6 4 6 5 30 4 9 30 30 3 5 8 30 8 50 6 2 12 6 4 4 4 300 15 3 15 2 50 45 2 650 3 1 2000 10 6 3 2 2 2 2 3	4057,46 4057,01 4056,90 4056,78 4056,38 4056,062 4055,46 4055,011 4054,55 4054,55 4054,55 4053,956 4053,814 4053,658 4053,540 4052,923 4052,380 4052,22 4051,58 4051,27 4050,617 4050,42 4050,05 4048,22 4047,480 4047,206 4047,184 4046,15 4046,15 4045,8147 4045,662 4044,96 4044,96 4044,96 4044,67 4044,65 4044,6125 4044,4185 4044,6125 4044,4185 4044,136 4044,09 4044,751	Xe II Kr II N II Cu I Kr I Cu I Cu I C III Cl II Ti I Mg I O II Ar I Cu II Cu II Ti II Cu II Cu II Kr II Cu I Kr II Ar II Cu I Kr II Xe III Cu I Kr II Cu II	200 300 4 35 3 35 7 4 20 2 00 80 9 0 15 3 10 1 12 2 12 4 10 20 50 200 1 1 17 20 20 200 15 3 10 10 10 10 10 10 10 10 10 10
			4043,751 4043,529 4043,502 4043,422 4043,21	Cu II N II Cu II Cs Xe III	9 75 20 20
4058,912 4058,139 4057,759 4057,672	Ca I Ti I N IV Ar II	1 7 8 1 5	4042,896 4042,642 4042,59 4042,327 4042,190 4041,311	Ar II Ne I K II Ne I Ar II N II	15 50 6 10 3 11
4057 ,612 4057 ,52 4057 ,5052	Cl II Mg I	6 10	4041 ,31 4040 ,64	O II	0 9

			1)	<u> </u>	
λ	Symbol	I	λ	Symbol	I
4040,310 4039,841 4039,69 4039,69 4039,345 4038,807 4038,057 4037,96 4037,83 4037,696 4037,59 4037,35 4037,29 4037,262 4036,53 4035,828 4035,828 4035,459 4035,09 4035,09 4035,09 4035,09 4035,09 4035,09 4033,883 4033,818 4033,818 4033,818 4033,64 4033,23 4031,378 4032,752 4032,665 4029,666 4029,41 4028,58 4028,36 4028,332 4028,36 4028,332 4028,332 4028,36 4028,332 4028,332 4028,36 4028,332 4028,36 4028,332 4028,36 4028,36 4028,359 4026,539 4026,539 4026,539 4026,539	Ti I Cs K II Xe II N II Ar II Si IV N II Kr II Ne I Ne I Xe II Ne I Cl II Xe II Cs Ti I Ar II O II Ti I Ar II CI I CI I CI I Ti I CI I CI I CI I Ti I CI I C	4 500 4 1 2 15 2 1 30 5 15 200 1 100 5 10 1 15 10 12 0 9 5 6 12 1 0 0 20 3 3 5 3 3 1 2 2 2 5 6 1 2 4 10 2 5 5 0 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5	4025,22 4025,19 4025,136 4025,010 4024,88 4024,739 4024,727 4024,573 4024,552 4024,04 4023,973 4023,582 4022,84 4022,629 4022,12 4021,8696 4021,812 4021,62 4021,167 4020,06 4020,015 4019,843 4018,50 4018,24 4017,771 4017,52 4017,278 4017,771 4017,52 4017,278 4017,152 4016,943 4016,56 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,377 4014,99 4014,534 4015,377 4014,99 4014,534 4016,56 4016,264 4016,22 4015,8 4016,264 4016,264 4016,264 4016,264 4016,22 4015,8 4017,776 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,264 4016,377 4014,534 4014,18	C I Xe II Ti II Fi II K II Fe I Fe II Ti I Fe II O II He I Ar III Cs C I Cu I C I Ti I Xe II Cl II Xe II Cl II Xe II Ti I Cu I Cs Fe I Cu I Cu I Cs Fe I Cu I Cs Fe I Cu I Cu I Cs Fe I Cu	$ \begin{array}{c} 1 \\ 30 \\ 2 \\ 10 \\ 4 \\ 6 \\ 20 \\ 35 \\ 5 \\ 1 \\ 26 \\ 10 \\ 30 \\ 2 \\ 25 \\ 4 \\ 31 \\ 5 \\ 2 \\ 2 \\ 12 \\ 3 \\ 4 \\ 5 \\ 3 \\ 6 \\ 2 \\ 2 \\ 10 \\ 10 \\ 2 \\ 2 \\ 5 \\ 2 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 3 \\ 6 \\ 2 \\ 8 \\ 10 \\ 4 \\ 4 \\ 4 \\ \end{array} $
4026 ,20 4026 ,4912 4026 ,075	Xe II He I N II	5 250 7	4009 ,884 4009 ,7154	C II Fe I	7 10
4025,68 4025,67	Cl II Cs	7 10	4009 ,653 4009 ,58	Ti I Al II	15 1
4025 ,60 4025 ,495	He II F II	15	4009 ,268 4008 ,926	He I Ti I	$\frac{5}{35}$

λ	Symbol	I	λ	Symbol	 I
4008,48 4008,08 4008,046 4007,632 4007,2735 4007,195 4006,772 4006,537 4006,159 4005,57 4005,51 4005,362 4005,2440 4003,789 4003,64 4003,470 4003,028 4002,98 4002,61 4002,466 4002,35 4001,682 4001,682 4001,56 4001,24 4001,135 4000,72 4000,55 3999,98	Kr II Kr II Ti I Ar II Fe I Ti I Cs Cs Cu 1I Ti I Kr II Cl I Ar II Fe I Ti I N III Cu II Cu II Cu II Cu II Kr III Kr III Kr III Xe II Kr II Kr II Xe II Kr II	10 25 9 2 6 3 10 30 3 6 30 - 2 25 10 4 2 15 2 15 9 80 20 1 0 7 1 2 5 4	3994,683 3993,863 3993,295 3992,85 3992,81 3992,210 3992,053 3991,94 3991,77 3991,50 3991,2581 3991,0797 3990,66 3990,33 3990,19 3989,758 3988,17 3988,158 3987,78 3987,09 3987,021 3986,88 3986,7533 3986,172 3985,96 3985,520 3985,46	Ti I Cs II Cs II Cu II Xe III Cl I F I Ar II Si II Cl III Kr I Kr I Kr II Kr II Kr II Cl II Ti I Cl II Ti I Cl II Ti I Cl II Ti I Cl II Kr II Fe I Xe III Li I O II	4 4 5 20 2 12 15 15 7 10 20 15 60 20 80 4 9 25 5 3 1 8 5 8 5 0 3
3999,92 3999,86 3999,336 3999,263 3999,248 3998,69 3998,635 3998,594 3998,0554 3998,018 3998,01 3997,3952	C III Ne II Ti I Ne I Ar II N III Ti I Ne I Fe I Cu I Si II Kr II Fe I	0 1 7 1 1 3 100 1 10 3 10 100 15	3985,202 3984,313 3984,253 3984,212 3984,065 3983,9593 3982,719 3982,478 3982,4699 3981,94 3981,80 3981,7743	Te I Xe I Ti I Ne I Mg I Ne I Fe I O II Ti I Kr I Cl II K II Fe I Ti I	30 37 1 2 10 5 30 6 15 4 7
3996,97 3996,69 3996,49 3996,381 3996,159 3996,05 3995,86 3995,721 3995,721 3995,17 3995,10 3994,998 3994,86	C I Kr II C I Al II Al II Xe II Al II Ne I CI II O IV K II N II	0 3 0 3 4 1 3 5 1 6 2 6 15 3	3981 ,761 3981 ,238 3980 ,56 3980 ,41 3980 ,323 3979 ,954 3979 ,7149 3979 ,356 3979 ,05 3978 ,98 3978 ,759 3978 ,000 3977 ,7437	Si III Al III Xe II C II Cu I Ar I Ar II Kr III Xe II C II Cs II Fe I	10 2 2 8 5 10 12 3 2 4 10 12 10
3994 ,83 3994 ,82 3994 ,789	Kr II Kr I Ar II	100 3 10	3977 ,46 3977 ,269 3977 ,10 3975 ,953	Si II C II O IV C II	5 1 1

λ	Symbol	I	λ	Symbol	I
3975,7 3975,59 3975,341 3974,791 3974,753 3974,66 3974,478 3974,417 3974,239 3973,760 3973,760 3973,767 3973,263 3972,58 3972,58 3972,58 3972,570 3972,439 3972,411 3972,047 3971,626 3971,574 3971,3250 3971,18 3970,386 3970,074 3969,95 3969,91 3969,95 3968,995 3968,995 3968,995 3968,995 3968,488 3968,43 3968,43 3968,43 3967,541 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3967,441 3966,6304 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,72 3966,83 3963,109 3962,851 3963,109 3962,851 3963,109 3962,851 3963,109 3962,851	Cu I Xe II C II F II Ar II O IV Ar II Cs C II Ca I O II F II K II K II Ca I C II F II F II C II C	5 4 2 6 9 -10 40 6 7 12 10 4 6 50 1 6 2 6 3 2 9 7 4 80 1 4 30 80 0 8 80 22 -20 200 1 8 4 6 10 1,5 10 25 30 100 35 5 6 0 6 35 10 8	3959,495 3958,39 3958,382 3958,206 3957,67 3957,20 3957,053 3956,85 3956,85 3956,66 3956,4574 3956,336 3956,10 3955,923 3955,851 3955,74 3954,78 3954,78 3954,596 3954,507 3954,596 3954,507 3954,507 3954,372 3954,372 3954,372 3954,296 3954,21 3953,95 3953,799 3953,95 3953,799 3953,080 3953,056 3952,982 3952,679 3952,666 3952,982 3952,729 3952,679 3952,606 3952,982 3952,729 3952,679 3952,606 3952,982 3952,61 3951,616 3951,788 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,958 3949,373	Cs II Cl III Ar II Ti I Kr III N I Ca I Xe I O IV Fe I Si III Fe I Ti I K II Cs N II Si II Kr II Si II Cl II Cl II Cl II Fe I Fe I Fe I Fe I Fe I Ti I Kr II CI II Fe I Xe II CI II CI II Fe I Xe II CI II CI II Fe I Xe II CI II CI II CI II Fe I Xe II CI	20 0 6 80 25 3 10 6
3961 ,5200 3961 ,40 3960 ,53 3959 ,84	Al I C I Ar III K II	26 3 8 3	3948,563 3948,333 3948,463 3948,107 3947,770	F I C II Xe I Fe I Ti I	5 6 60 6 40
•		"	,		-0

λ	Symbol	I	λ	Symbol	I
3947 ,715 3947 ,66 3947 ,594 3947 ,5048 3947 ,489	C II Kr II O I Ar I O I	6 5 4 1000 7	3934 ,527 3934 ,46 3934 ,41 3934 ,29	Ti I K II N III C IV Kr IV	50 5 3 2 5 5
3947 ,488 3947 ,301 3947 ,079 3946 ,938 3946 ,429	Si III O I C II Cu I C II	6 10 2 3 1	3934 ,29 3934 ,262 3934 ,228 3933 ,663 3933 ,605 3933 ,260	FI TiI CaII FeI CuII	5 9 23 10 3
3946 ,278 3946 ,096 3945 ,83 3945 ,749 3945 ,65	C II Ar II Kr II Cu II F II	5 12 1 2 4	3933 ,22 3933 ,17 3933 ,11 3933 ,027 3932 ,548	Xe II Ar II F I Cu I Ar II	1 2 3 5 15
3945 ,570 3945 ,48 3945 ,29 3945 ,197 3945 ,048	Cu II Kr II O IV C II O II	5 5 - 4 5	3932,007 3931,996 3931,235 3930,689 3930,63	Ti II Al I Ar II F I O IV	2 5 12 8 —
3945,003 3944,79 3944,33 3944,272 3944,193	C II Cl I F II Ar II C II	5 3 6 15 3	3930 ,2981 3929 ,875 3929 ,46 3929 ,26 3928 ,63 3928 ,629	Fe I Ti I Cs Kr II Cl II Ar II	25 40 2 20 5 25
3944,0058 3943,57 3943,540 3942,93 3942,78	Al I Xe II Ne I Kr II N III	24 20 2 20 1	3927,9216 3927,88 3926,80 3926,58	Fe I Cl II Xe II O II He I	$\frac{30}{6}$ $\frac{1}{7}$
3942,53 3942,4418 3942,29 3942,22 3942,21	K II Fe I Xe I C I Xe II	6 6 2 3 3	3926,534 3926,36 3926,319 3926,05 3926,03	K II Ti I Kr I Ar II	5 10 1 7
3942 ,19 3942 ,14 3941 ,52 3941 ,23 3940 ,92	Ne II O IV F II N II Kr II	3 -3 1 5	3925 ,947 3925 ,87 3925 ,722 3925 ,583 3925 ,274	Fe I Cl III Ar II Cs II Cu I	$\begin{array}{c} 6 \\ 5 \\ 10 \\ 25 \\ 8 \end{array}$
3940 ,8797 3940 ,66 3939 ,57 3939 ,03 3938 ,92	Fe I N II N II F II Xe II	5 2 4 7 15	3924,51 3924,468 3923,556 3923,50	Ti I Si III Ar II Ca I Cu II	50 20 1 0 3
3938 ,88 3938 ,843 3938 ,53 3938 ,52	Kr II Ar II Kr III N III	20 1 4 4 6	3923,438 3923,00 3922,9134 3922,53 3922,528	K II Fe I Xe III Ar II	5 25 500 1
3938,400 3937,66 3935,912 3935,8143 3935,677	Mg I Xe II He I Fe I Al I Ar II	2 2 8 4	3922,359 3921,75 3921,69 3921,68 3921,6 3921,423	Ar II Cl II Cs Kr II Li I Ti I	$\begin{array}{c} 2\\ 3\\ 4\\ 6\\ \hline -30 \end{array}$
3935 ,275 3935 ,00 3935 ,0 3934 ,89	F II O III C IV	3 2 1	3921 ,267 3920 ,693 3920 ,641 3920 ,2601	Cu I C II Cu II Fe I	5 18 5 20

λ	Symbol	I	λ	Symbol	I
3920,44 3919,822 3919,287 3919,00 3918,999 3918,978 3918,646 3918,57 3917,766 3917,64 3917,57 3917,1834 3916,90 3916,70 3916,60 3915,879 3915,82 3915,30 3915,329 3914,768 3914,751 3914,768 3914,751 3914,751 3914,751 3914,788 3912,59 3913,464 3913,37 3912,88 3912,59 3912,088 3911,960 3911,572 3911,185 3910,60 3908,43 3907,9371 3907,91 3907,91 3907,91 3907,91 3907,91 3907,91 3907,91 3907,84 3907,9371 3907,91 3907,84 3907,9371 3907,91 3907,84 3907,85 3906,933 3906,4814 3906,25 3905,85 3905,85 3905,85 3903,819 3903,70 3903,859 3902,9484 3902,84	Kr II Ti I O II Si II N II C II Fe I Xe II Kr II Cl II Fe I Kr II Cl II Xe II Ti I Cl II Xe II Ti I Cl II Kr III O II Ar II Ti I Cl II Ar II Ti I Cl II Kr III CS Kr II O II Ar II CI II Ar II Ti I CI II Ar II CI II	200 56 59 156 24 50 18 8 3 60 25 10 10 8 2 100 7 40 8 150 10 10 10 10 10 10 10 10 10 1	3901,12 3900,958 3900,680 3900,624 3900,546 3900,11 3900,09 3899,878 3899,723 3899,7086 3899,542 3899,28 3899,22 3898,833 3898,725 3898,472 3898,472 3898,478 3898,478 3898,478 3898,120 3898,120 3898,120 3898,120 3898,912 3897,92 3897,92 3897,92 3897,92 3897,92 3897,92 3896,66 3896,682 3896,66 3896,30 3896,12 3896,66 3896,572 3895,572 3895,572 3895,572 3895,250 3895,243 3894,71 3894,6603 3894,55 3893,393 3893,393 3893,393 3893,913 3893,913 3892,69 3892,206 3891,984 3891,906 3891,929 3891,400 3891,114 3890,241	Cl II Ti I Cs Al II Ar II Ti II Ks II Kr II Kr II Fe I Kr II Co II Fe I Co II C	$\begin{smallmatrix} 4 \\ 12 \\ 4 \\ 10 \\ 11 \\ 70 \\ 3 \\ 4 \\ 100 \\ 2 \\ 30 \\ 1 \\ 3 \\ 4 \\ 86 \\ 20 \\ 20 \\ 10 \\ 8 \\ 5 \\ 4 \\ 10 \\ 8 \\ 6 \\ 20 \\ 10 \\ 8 \\ 5 \\ 4 \\ 10 \\ 8 \\ 6 \\ 2 \\ 10 \\ 8 \\ 6 \\ 2 \\ 10 \\ 10 \\ 8 \\ 6 \\ 2 \\ 10 \\ 10 \\ 10 \\ 2 \\ 10 \\ 10 \\ 2 \\ 10 \\ 10$
3901 ,955 3901 ,89 3901 ,852 3901 ,45	F II Cl II F II Kr II	5 5 2 10	3889 ,051 3888 ,648 3888 ,610 3888 ,517	H He I Cs I Fe I	60 5000 150 20
7					

3888 A0						·
3888,020 Ti I 4 3374,10 0 II 2 3887,040 T 60 3374,04 Kr III 3 3887,640 T 60 3387,7624 Fe I 8 3887,134 Ne I 1 2 3873,7624 Fe I 8 3887,134 Ne I 1 2 3873,203 Ti I 10 3886,63 CI II 4 3872,552 Ca I 3 3886,239 Fe I 40 3872,552 Ca I 3 3886,2839 Fe I 40 3872,552 Ca I 3 3885,594 CI II 5 3872,143 Ar II 11 3885,92 Cu I 3 3872,143 Ar II 11 3885,5165 Fe I 5 3871,791 He I 5 3885,5165 Fe I 5 3871,791 He I 5 3885,501 K III 1 3871,791 He I 5 3885,50 Ke II 4 3871,609 C II 7 3885,28 Kr II 1 3871,7513 Fe I 4 3885,28 Kr II 1 3871,7513 Fe I 4 3885,40 Xe II 20 3889,63 Xe II 20 3884,523 Cu II 5 3889,63 Xe II 20 3884,523 Cu II 5 3889,614 Ar II 2 3883,80 CI II 12 3869,5615 Fe I 4 3883,80 CI II 12 3869,5615 Fe I 4 3883,42 K II 3 3883,452 K II 3 3883,42 K II 3 3888,614 Fe I 4 3883,42 K II 3 3888,62 CI II 4 3883,452 K II 3 3888,614 Fe I 4 3883,47 C II 6 3883,47 C II 6 3883,48 Fe I 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	λ	Symbol	1	λ	Symbol	I
3860,98 CI II 100 3875,264 Ar II 12 3860,898 Cu I 5 3875,262 Ti I 20 3860,80 Cl II 150	3888,020 3887,993 3887,640 3887,54 3887,54 3886,84 3886,63 3886,2839 3885,941 3885,92 3885,5165 3885,501 3885,45 3885,28 3885,28 3884,523 3884,523 3884,523 3884,120 3883,816 3883,816 3883,816 3883,42 3883,42 3882,45 3882,45 3882,45 3882,47 3882,47 3881,714 3881,73 3881,714 3881,73 3881,714 3881,73 3881,714 3881,73 3881,714 3881,399 3880,588 3880,588 3880,588 3880,46 3879,387 3879,640 3879,640 3879,387 3878,663	Ti I D T Kr II Ne I K III Cl II Fe I C III Cu I Fe I K III Cu II Cu II Cu II Cu II Cu II Ti I Cu II Ti I Cu II Ti I Cu II Ti I Cu II	4 60 60 5 1 2 4 40 5 3 5 1 4 1 20 5 10 1 4 12 3 3 20 2 1 10 7 15 3 5 4 7 60 6 6 2 7 60 60 60 60 60 60 60 60 60 60	3874,10 3874,04 3873,7624 3873,7624 3873,203 3873,067 3872,552 3872,552 3872,5032 3872,45 3871,791 3871,7513 3871,669 3870,508 3870,508 3870,164 3869,63 3869,614 3869,5615 3869,275 3869,10 3868,70 3868,874 3868,70 3868,874 3868,70 3868,62 3868,524 3868,397 3868,358 3867,739 3867,475 3867,2184 3866,291 3866,291 3866,291 3866,291 3866,291 3866,291 3866,291 3864,68 3864,68 3864,68 3864,68 3864,68 3864,68 3864,121 3863,50 3862,823 3862,781 3863,50 3862,823 3861,41 3861,489 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449 3861,449	O II Kr III Fe I K II Ti I C II Ca I Fe I O II Ar II He I Ca I Cs II Xe II Ti I Ti I C II Ti I Ti I Ti I Ti I Ti I Ti I Cu II Fe I Cu II Fe I Cu II Co II C	2 3 8 5 10 0 3 60 11 15 4 7 2 4 2 2 4 5 4 6 4 0 2 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1

λ	Symbol	I	λ	Symbol	I
3860 ,472 3860 ,05 3859 ,9132 3859 ,33 3859 ,2143 3859 ,17 3858 ,860	Cu I Cl II Fe I Al II Fe I Cl II Mg I	600 2 300 3 10 7 2	3846,436 3846,12 3845,9778 3845,84 3845,69 3845,42 3845,406	Ti I Kr I Kr I Cl II Cl II Cl II Ar II	6 2 15 30 75 50 10
3858,78 3858,53 3858,46 3858,32 3858,133	Kr II Xe II Ar IV Ar III Ti I	2 5 20 — 10 15	3845,1706 3844,735 3844,565 3844,51 3844,45	Fe I Ar II Ar II Cu I Kr II	5 9 4 4 50
3857,32 3857,18 3856,62 3856,373 3856,16	Kr II O II C II Fe I O II	20 4 0 50 5	3844,02 3843,58 3843,26 3843,2596 3842,82	K II O II Cl II Fe I O II	1 3 100 8 3
3856 ,127 3856 ,057 3856 ,017 3855 ,160 3855 ,100 3854 ,965	Ar II N II Si II Ar II N II Mg I	1 6 500 4 5	3842,61 3842,577 3842,458 3842,317 3842,28	Ti I Cu II Si III Al II Kr II	3 4 7 1 20
3854,75 3854,30 3853,960 3853,719 3853,664	Cl II Xe III Mg I Ti I Si II	15 10 2 10 100	3842,213 3842,183 3842,037 3841,88 3841,52	Al II N II Al II Xe III Xe III	2 5 3 20 100
3853,038 3852,5752 3851,69 3851,667 3851,47 3851,38	Ti I Fe I Cl II F II O II Cl II	10 6 30 10 0 75	3841 ,518 3841 ,0499 3840 ,48 3840 ,4397 3839 ,37	Ar II Fe I Ne II Fe I Kr II	6 80 1 80 4
3851 ,04 3850 ,97 3850 ,8193 3850 ,81 3850 ,81	O II Cl II Fe I Cl III O II	3 100 12 4 2	3839 ,2584 3838 ,374 3838 ,37 3838 ,2943 3838 ,2918	Fe I N II Cl II Mg I Mg I	7 8 20 .20 .20
3850 ,578 3850 ,385 3850 ,03 3849 ,987 3849 ,9694	Ar II Mg II Cu II F II Fe I	30 7 2 15 40	3838,239 3838,15 3838,100 3837,976 3837,81 3837,68	Ar II Li I He I Cu I Kr I F II	1 3 2 5 30
3849 ,87 3849 ,570 3849 ,33 3848 ,914 3848 ,58	Xe II Cu II Cl II Mg I Xe II	50 2 3 1 6	3837,449 3836,763 3836,683 3836,54 3836,333	Cs Ti I C II Kr II Fe I	0,5 4 5 2 30 4
3848 ,27 3848 ,209 3847 ,89 3847 ,49 3847 ,409 3847 ,086	Cs II Mg II O II Kr III N II F II	2 8 3 5 20	3836,150 3835,730 3835,6 3835,386 3835,37 3834,84	Cu 1I C II Xe I H Kr III N I	$\begin{array}{c} 4 \\ 6 \\ 2 \\ 40 \\ 2 \\ 2 \end{array}$
3846,860 3846,83 3846,8023	Ar II Kr II Fe I	2 5 8	3834 ,6788 3834 ,342 3834 ,24 3834 ,24	Ar I D N I O VI	800 40 4 1

λ	Symbol	I	λ	Symbol	I
3834,2244 3833,994 3833,91 3833,554 3833,40 3833,35 3833,3103 3833,10	Fe I T Ti I He I Cl II C I Fe I O II	100 40 3 4 200 3 5 3	3820,4274 3820,25 3819,758 3819,61 3819,6072 3819,017 3818,869 3818,52	Fe I Cl II He I Cs He I Ar II Cu II F II	250 100 10 4 100 5 3 2
3832,3037 3832,2996 3831,743 3831,17 3830,80 3830,515 3830,45 3830,390	Mg I Mg I C II Kr II Cl II Ar II O II Ar II	20 18 8 2 15 4 4	3818,44 3818,40 3818,27 3817,639 3817,50 3817,490 3817,11 3816,72 3816,56	Ne II Cl II N I Ti I K II Cu I Kr II O III K II	$\begin{matrix} 6 \\ 30 \\ 2 \\ 5 \\ 7 \\ 5 \\ 15 \\ 1 \\ 6 \end{matrix}$
3830,39 3830,26 3830,165 3829,793 3829,77 3829,77 3829,77 3829,57	N I O I Ar II N II Ne II Xe II Xe III Kr III	9 -1 6 7 10 20 1	3815,8430 3815,70 3814,855 3814,65 3814,580 3813,542 3813,390	Fe I Ar III Ti I F II Ti II Cu I Ti II	100 1 4 4 4 10 2
3829,3549 3829,27 3828,85 3828,180 3827,8256 3827,68 3827,68	Mg I Cl II C I Ti I Fe I F II Cl II	36 15 2 3 75 0,5	3812,9658 3812,2155 3811,95 3811,385 3811,35 3811,212 3811,05 3810,99	Fe I Kr I Cu I Ti I O VI Ar II Xe II O III	40 20 8 4 2 2 40 2
3826,908 3826,86 3826,807 3826,27 3826,15 3825,8834 3825,676 3825,530	Cu II Xe I Ar II Xe II Kr II Fe I Ar II O I	5 15 12 2 2 200 8	3810,10 3809,84 3809,51 3809,456 3809,30 3809,16	Cl II Xe I Cl II Ar II Kr IV Kr III	30 30 40 15 3 7
3825,249 3825,090 3825,047 3824,47 3824,4455 3824,425	O I O I Cu I Cl III Fe I O I	4 3 100 4 50 3	3808,7306 3808,577 3807,5392 3807,29 3806,6992 3806,544 3806,52	Fe I Ar II Fe I Xe II Fe I Si III Kr II	4 11 7 10 10 30 1
3823,95 3823,74 3823,469 3823,35 3823,254 3823,49 3822,63	N IV Xe I O I Xe II Ar II Ne II O I	0 10 10 2 3	3806,30 3806,17 3805,90 3805,740 3805,412 3805,3450 3805,24	Ne II Kr II F II He I Cs II Fe I Cl II	2 8 5 3 2 12 75
3822,07 3822,02 3821,68 3821,30 3821,1807 3820,884	N I Cl III O II K II Fe I Cu I	6 4 4 3 10 60	3805,232 3805,096 3804,83 3804,67 3804,31 3803,57	Cu I Cs II Cl III Kr II C I Cl III	100 25 3 30 2 3

	λ	Symbol	I	λ	Symbol	I
	3803,49 3803,172 3803,14 3801,90 3801,39 3801,09 3800,99 3800,5437 3800,502 3800,42 3800,25 3800,42 3800,25 3800,14 3800,02 3799,88 3799,5498 3799,5498 3798,5134 3798,46 3798,5134 3798,46 3798,80 3797,900 3797,832 3797,900 3797,832 3797,517 3797,245 3796,8899 3796,8839 3796,8839 3796,8839 3796,522 3796,866 3796,599 3796,522 3796,30 3796,114 3795,95 3795,903	Cu I Ar II O II Xe I Xe I Ti I F II Xe II Kr I Cu I Ar IVI Ar III Ku II Fe I Fu	5 10 6 3 30 3 30 3 30 6 6 5 10 50 40 3 6 4 20 50 40 3 6 4 20 20 8 20 20 8 20 20 8 20 20 8 20 20 8 20 40 20 40 20 40 40 40 40 40 40 40 40 40 4	3786 ,253 3786 ,261 3786 ,176 3786 ,043 3785 ,97 3785 ,951 3785 ,49 3785 ,424 3785 ,01 3784 ,862 3783 ,92 3783 ,13 3783 ,19 3783 ,13 3781 ,63 3781 ,3570 3781 ,23 3780 ,98 3780 ,98 3780 ,98 3780 ,045 3779 ,446 3779 ,35 3779 ,23 3779 ,067 3778 ,78 3778 ,09 3777 ,529 3777 ,52 3777 ,16 3776 ,4553 3776 ,30 3776 ,20 3776 ,20 3776 ,062 3777 ,529 3777 ,16 3776 ,4553 3776 ,20 3776 ,30 3776 ,20 3776 ,062 3777 ,52 3777 ,16 3776 ,4553 3776 ,20 3776 ,30 3776 ,20 3777 ,52 3777 ,16 3777 ,52 3777 ,16 3777 ,52 3777 ,16 3777 ,52 3777 ,16 3777 ,52 3777 ,30 3776 ,20 3776 ,30 3776 ,20 3776 ,30 3776 ,20 3777 ,52 3777 ,16 3777 ,52 3777 ,16 3777 ,52 3777 ,60 3777 ,52 3777 ,16	Ti I Cu II Fe I Ti I Fe I Ti I Fe I Cu I Cs II O II He I Ne Xe II Kr II Ne F II Ar I Cu I Fe I Cl III Xe III Cu I Fe I Cl III Xe III Cu I Fe I Cl III Xr II Cu I Xr II Xr II Cu I Xr II	3 5 4 20 3 6 5 20 0 2 1 10 6 500 1 2 300 300 25 1 5 4 5 - 2 1 500 4 2 - 8 6 40 4 6 1 10 5 3 4 - 25 6 6 20 50 6 6 20 100
	3790 ,96 3790 ,0943 3789 ,293 3787 ,8825	Ne II Fe I Ti I Fe I	3 12 8 50	3771,504 3771,652 3771,64 3771,45	Ti I Ne N III	25 1 2
7 30	3787 ,32 3786 ,6781 3786 ,383 3786 ,29	re I Xe II Fe I Ar II Ne	3 8 12 2	3771 ,34 3771 ,08 3770 ,632 3770 ,516 3770 ,37	Kr II N III H Ar II N III	30 7 15 10
7.3(1)						

					
λ	Symbol	I	λ	Symbol	I
3770,3698 3770,12 3769,69 3769,654 3769,606 3769,449 3769,264 3769,13 3768,784 3768,13 3768,05 3768,047 3767,57 3767,57 3767,36 3767,1939 3766,445 3766,29 3766,118 3766,043 3765,88 3765,88 3765,88 3765,819 3765,5414 3765,269	Ar I Xe II Kr III Ne I D Ne I T Cl II He I Cl II Cl II K II Fe I Ti I Kr II Ti I Kr II Xe III Ne I Kr II Te I	400 3 2 5 15 7 15 20 2 18 5 30 6 80 3 8 11 20 2 10 5 20 2 2 10 2 2 2 3 3 4 5 6 8 8 9 1 2 2 2 2 2 3 8 8 8 8 8 8 8 8 8 8 8 8 8	3757,05 3756,92 3756,87 3756,62 3756,52 3756,107 3755,82 3755,668 3755,12 3754,67 3754,62 3754,24 3754,215 3754,052 3753,83 3753,623 3753,6134 3753,521 3753,519 3753,367 3753,3	C I Cl II Xe II Ar II K II C I He I O IV Ca II C I O III N III Kr II Ne I Ar II Ti I Fe I Ar II Cu I Ca I F II Al II	3 2 10 4 3 2 1 - 2 1 7 6 80 50 6 5 25 8 9 8 1 0
3764,837 3764,42 3763,96 3763,7910 3763,504 3763,37 3763,111 3762,63 3762,62 3762,435 3762,26 3762,25	Cu I Cl III C I Fe I Ar II Xe II Ar II O II N III Si IV Xe II C I	5 2 0 100 12 15 2 5 8 10 2	3752,860 3752,65 3752,36 3751,402 3751,330 3751,26 3751,047 3750,79 3750,485 3750,349 3750,154 3750,00	Ti I N III F II Cs II Ar II Ar II Ar IV Ar II Ca I II Cl II	80 3 2 4 1 5 2 - 5 1 10 30
3762,05 3761,866 3761,72 3761,62 3761,6 3761,320 3760,5335 3760,052 3759,87 3759,492	Xe II Ti II Ca I Ca III O V Ti II Fe I Fe I O III Cu I	3 15 0 6 - 200 6 8 9 60	3749,49 3749,4875 3748,81 3748,492 3748,489 3748,46 3748,374 3748,2639 3748,207 3748,101	O II Fe I Cl III Fe I Fe II Cl II Ca I Fe I Cu II Ti I	9 200 8 7 8 15 1 60 3 6
3759,460 3759,291 3759,10 3758,93 3758,45 3758,386 3758,296 3758,2350 3757,84 3757,666 3757,66 3757,60 3757,21	Fe II Ti II Cl III Kr II O IV Ca II Cu I Fe I C I Ti II N III N III	6 200 3 6 0 3 5 150 1 30 —	3748,010 3747,54 3747,1 3746,929 3746,915 3746,452 3745,9013 3745,83 3745,72 3745,69 3745,5623 3745,38	Ti II N IV O V Fe I Ar II Fe I N III Xe III Xe I Fe I Xe I	10 6 5 6 40 4 25 4 100 10

λ	Symbol	I	λ	Symbol	I
3745,356 3744,80 3744,73 3744,66 3744,42 3744,274 3743,7653 3743,468 3743,3640 3743,363 3742,85 3742,22 3741,70 3741,69 3741,69 3741,69 3741,44 3741,242 3741,059 3740,79 3740,79 3740,79 3740,79 3740,79 3740,60 3739,92 3739,60 3739,375 3739,43 3738,901 3738,76 3738,637 3738,637 3738,637 3738,3078 3738,003 3737,19 3737,19 3737,19 3737,19 3737,19 3737,19 3735,78 3735,78 3735,78 3735,78 3735,78 3735,78 3735,78 3735,330 3734,94	Cu I Kr II O IV Ne II K II Ar II Fe I Fe I Cu I C I I Xe I Cl III Kr II O II Ti II C I Ti I C I I I I I I I I I I I I I I I I I I	20 150 0 4 5 1 100 6 20 3 1 1 3 200 0 50 2 450 60 0 6 1 5 5 4 4 3 10 6 4 1 5 1 5 1 6 1 6 1 6 1 6 1 6 1 6 1 6 1 6	3732,61 3732,539 3732,359 3732,35 3732,13 3731,950 3731,67 3731,18 3729,9806 3729,70 3729,34 3729,310 3729,03 3729,03 3729,03 3728,82 3728,49 3728,49 3726,42 3727,6211 3727,33 3727,08 3726,925 3726,4 3725,46 3725,46 3725,46 3725,46 3725,30 3725,155 3724,9 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3724,570 3721,940 3721,86 3722,568 3722,5682 3721,86 3721,666 3721,632 3721,35 3721,34 3720,86 3720,86	Symbol Kr II Cs II Fe I C I O III Al II Kr II Cs Ti I O III Ar II C I O III Ar II Fe I O II Ne II Fe I O IV Cl III Cl III Cl III Cl III Cl III Cl III Ti I Fe I Ti II Fe II	15 4 10 2 1 1 1 2 20 4 50 1 2 30 1 3 1 0 7 50 8 9 6 5 2 3 1 3 20 4 20 8 8 15 50 2 1 6 2 8 15 150 5 3 40
3734,8659 3734,80 3734,567 3734,51 3734,370 3734,337	Fe I O III Al II C I H Cs II	300 1 1 0 8 10	3720 ,771 3720 ,45 3720 ,428 3719 ,9367 3718 ,7	Cu I Cl III Ar II Fe I Li I	150 8 9 250 5
3734,180 3734 3733,910 3733,767 3733,73 3733,3191	Cu I O IV Al II Ti I Cl II Fe I	200 3 2 4 10 40	3718,63 3718,208 3718,02 3717,94 3717,5 3717,393	Kr II Ar II Kr II Cl II O V Ti I	200 12 300 15 — 20
3733,010 3732,92 3732,865	He I Kr II He I	3 6 10	3717,20 3717,174 3716,60 3716,448	Xe II Ar II K II Fe I	20 10 5 12

	-	! [1		1
λ	Symbol	I	λ	Symbol	I
3716,15 3715,69 3715,08 3715,04 3714,737 3714,03 3714,43 3713,19 3713,103 3713,084 3713,019 3712,75 3712,733 3712,48 3712,48 3712,04 3712,09 3711,974 3711,64 3711,27 3711,074 3710,774 3710,774 3710,774 3710,774 3710,774 3710,774 3710,774 3710,774 3710,765 3709,963 3709,918 3709,918 3709,918 3709,918 3709,52 3709,2484 3709,52 3709,2484 3707,823 3707,9216 3707,823 3707,9216 3707,823 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,9216 3707,549 3707,549 3707,549 3706,937 3706,63 3706,937 3706,63 3706,937 3706,63 3705,567 3705,56 3705,56 3705,56 3705,56 3705,45	Kr II Xe II O III Kr II O III Kr II O III N IV Ar IV Al III O II F I O III Kr II C I I I I I I I I I I I I I I I I I	4 2 6 12 6 2 — 15 10 2 7 0,8 2 1 30 5 20 1 6 4 4 20 6 7 2 75 4 4 8 20 10 6 6 4 4 8 20 10 6 6 6 7 10 10 10 10 10 10 10 10 10 10	3702,75 3702,74 3702,291 3702,2 3702,086 3702,005 3701,81 3701,2247 3701,090 3701,070 3700,536 3699,98 3699,475 3699,20 3699,097 3699,0 3698,70 3698,183 3698,0452 3697,154 3697,09 3696,82 3696,69 3696,5082 3695,37 3695,358 3695,358 3695,054 3694,445 3694,445 3694,45 3694,15	O III Xe I Ti I O V Al III Ar II Ne II Ne II Fe I Cu I Cu I Kr III Cs Cs II Cu I O V O III Ti I Kr I H Ne II Xe I Kr III Ar I O I II Cu I Fe I Ar II Cu I Fu I Ar II Cu I Fu II Cu II Fu	5 2 10 10 2 4 40 20 5 250 2 10 10 10 5 3 6 3 2 4 5 20 4 8 8 2 10 10 4 20 40 7 1 5 2 1 2 300 1 30
3704,73 3704,51 3704,4635 3704,295 3703,855 3703,71	F II Fe I Ti I H C III	8 10 15 4 4	3690,65 3690,2 3690,018 3689,95 3689,916 3689,6	Kr III O V F I N IV Ti I C IV	$ \begin{array}{r} 30 \\ \hline 4 \\ \hline 45 \\ \hline 2 \\ \hline 43 \\ \end{array} $
3703,550 3703,37 3703,3 3703,217 3703,03	Ar II O III O V Al II Cl I	1 5 — 4 —	3689 ,463 3689 ,40 3688 ,80 3688 ,44 3688 ,10	Fe I F I Xe I Cl III Cl III	12 1 1 15 2

λ	Symbol	I	λ	Symbol	I
3687,88 3687,708 3687,64 3687,4589 3687,4589 3686,833 3686,555 3686,15 3686,003 3685,90 3685,7351 3685,192 3684,930 3684,672 3684,1102 3684,1102 3684,1 3683,696 3683,39 3683,0562 3682,810 3682,547 3682,428 3682,2421 3682,2421 3682,2421 3682,2421 3682,2421 3682,2421 3682,35 3681,54 3681,402 3681,10 3680,454 3680,37 3680,101 3680,064 3679,9152 3679,80 3679,67 3679,58 3679,58 3679,58 3679,58 3679,31 3678,8620 3678,66	N I Cu I Cs II Fe I Cu I Ti I H Cu II Kr II Fe I Xe I Ne I Ti II Cu I Cu I Fe I Li II Cu II Fe I Si III Kr II Fe I Si III Ne I Fe I Si III Kr II	2 40 4 400 400 5	3673,83 3673,761 3673,448 3673,266 3672,85 3672,57 3671,953 3671,672 3671,478 3671,14 3671,005 3670,6693 3670,28 3670,23 3670,071 3670,028 3669,91 3669,605 3669,5229 3669,466 3669,466 3668,965 3668,965 3668,965 3668,965 3668,97 3668,7363 3668,60 3668,60 3668,59 3668,7363	Cl II H Ca I Ar II F I Xe II Cu I Ti I H Kr III Ar I Li I Cl III Fe I Fe I Ar II Fe I H Cl II Kr II Fi I F II Kr II F II Kr II F II Kr II	18 — 1 5 2,5 100 20 — 1 4 300 3 7 4 3 3 10 9 10 — 2 150 15 0 10 1 3 6 12 20 4 — 5 125 80 — 9 5 5 5 5
3678,274 3678,240 3677,6309 3677,54 3676,878 3676,731 3676,63 3676,365 3676,3135 3676,05 3675,307 3675,2367 3674,23 3674,05 3674,05	Ar II Ca I Fe I Xe I Cu I Si III Xe III H Fe I K II Ca I Ar I Xe II Xe II	10 3 12 2 50 3 50 — 6 3 2 300 4 2 1	3663,44 3663,406 3662,366 3662,258 3662,237 3661,793 3661,48 3661,391 3661,221 3661,00 3660,631 3660,439 3660,27 + 3659,93 3659,84	Kr II II Si III H Ti II F I Xe II Cl III Cs H Kr II Ti I Ar II H Ne II	20 -2 -40 3 20 1 6 -15 12 10 -3 18

λ	Symbol	I	λ	Symbol	I
3659,765 3659,5305 3659,521 3659,353 3658,44 3658,38 3658,33 3658,097 3657,74 3657,218 3657,487 3656,95 3656,95 3656,785 3656,50 3655,73 3655,73 3655,73 3655,73 3655,73 3655,412 3655,00 3654,979 3654,63 3654,592 3654,243 3653,97 3653,497 3653,497 3653,497 3653,497 3653,497 3653,497 3653,497 3651,721	Ti II Ar I Fe I Cu I Xe II Cl II Al III Ti I Xe II Ar II F I Cl III Cu I F II Cu I Kr III Cs Ar II Si III Al II Xe III Ti I Cu I Kr II Cu I Kr II Cu I He I He I Si III Fe I F I Al II Cu I Ar II Cu I Kr II Cu I Kr II Cu I Kr II Cu I Kr II Cu I Cu I Kr II Cu I Kr II Cu I Cu I Cu I Kr II Cu I C	60 100 8 125 6 20 1 20 5 2 3 7 125 0,5 100 14 12 4 8 4 20 15 200 250 100 3 1 1,5 0 2 7 2 2 2 2 4 6 2 6 7 7 8 8 9 1 1 1 9 1 9 1 9 1 9 1 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1	3646,84 3646,198 3645,825 3645,232 3645,20 3645,123 3644,990 3644,91 3644,86 3644,765 3644,410 3644,14 3643,89 3643,1169 3642,798 3642,675 3641,985 3641,40 3641,34 3641,332 3641,330 3641,411 3641,332 3641,330 3641,011 3641,300 3640,891 3640,3918 3639,445 3639,19 3638,898 3639,445 3639,19 3638,898 3637,966 3637,943 3637,943 3637,93 3637,48 3637,93 3637,93 3637,943 3637,966 3637,943 3637,966 3637,943 3637,966 3637,943 3637,966 3637,933 3637,48 3637,966	O III Ti I Fe I Cu I O III Si III Ca I Xe II Ne II Ca I Xe II Ne II Cu I Ar I F II Ti I F II Cu I Cs Kr III F II F II Si III F II Si III F II Si III F II	2 12 6 250 1 6 2 5 4 15 5 40 5 5 5 40 5 5 5 40 7 80 8 8 50 4 30 5 100 3 15 12 12 15 18 18 18 18 18 18 18 18 18 18 18 18 18
3648,61 3648,383 3648,07 3647,95 3647,8439	Cu I Cl II K II Fe I	125 10 2 100	3633,54 3633,458 3633,06 3632,75 3632,6837	Kr II Ti I Xe I Ne II Ar I	3 5 6 2 300
- ,					73

					
λ	Symbol	1	λ	Symbol	I
3632,558 3632,4896 3632,308 3632,14 3631,87 3631,4646 3631,266 3631,096 3630,974 3630,776 3630,748 3630,620 3629,963 3629,771 3628,57 3628,1570 3628,57 3628,06 3627,63 3627,32 3626,91 3626,42 3626,985 3627,48 3624,4890 3624,890 3624,896 3624,56 3624,236	Cu I Kr III Kr I Cu I Xe III Kr II Fe I Na II Fe I Ca I Ca I Cs II Kr I K	50 1 4 5 20 200 125 8 7 15 1,5 30 2 4 10 3 10 4 125 2 4 10 4 125 2 4 10 4 125	3617,788 3617,295 3615,858 3615,82 3615,583 3615,4755 3615,09 3614,989 3614,873 3614,218 3613,761 3613,761 3613,643 3613,66 3612,85 3612,37 3612,352 3612,352 3612,353 3612,074 3611,812 3611,52 3611,459 3611,459 3611,365 3611,06 3610,809 3610,32 3610,162 3610,154	Fe I Cs I N II Kr III Mg II Kr I Cl II Cs Fe II Cu I Mg II Cu I He I Xe I Cl III Xe II Al III Ne II Fe I Ar II Xe II Cs I II II Fe I II I	12 60 2 20 3 20 10 4 5 200 4 600 30 8 8 20 15 3 8 5 1 200 15 200 15 200
3624,56 3624,236 3624,111 3624,05 3623,84 3623,79 3623,61 3623,444 3623,1878 3622,691 3622,69 3622,538 3622,53 3622,140 3622,005 3622 3621,98 3621,4640 3621,273 3621,245			3610,154 3610,07 3609,808 3609,75 3609,625 3609,56 3609,44 3609,295 3609,1787 3609,097 3609,063 3608,89 3608,88 3608,8609 3608,81 3608,70 3608,285 3607,94 3607,88	Ti I Cl II F I Cl II C III C III C III Cu I Ne I N II C III F II K II Fe I C III C I Cs C I Kr II Xe II	12 12 1,5 4 6 0 20 200 50 4 5 3 5 100 3 1 10 0
3621,012 3620,807 3620,789 3620,352 3619,581 3618,90 3618,88 3618,7694 3618,549 3618,49 3618,49	Ar II Ar II F I Cu I Si III Xe III Cl II Fe I Cs II K II Cs	3 3 1 225 3 4 15 125 2 6	3607,401 3607,32 3607,01 3606,80 3606,786 3606,6821 3606,5224 3605,883 3605,61 3605,535 3605,458 3605,39	Ar II F II Xe III F II Ti I Fe I Ar I Cl II Cs Fe I Cl II	2 3 40 4 4 20 1000 12 7 4 15 5

<u>!</u>	11		
λ Symbol	. λ	Symbol	I
3604,51 Cl II 13 3604,401 F I	3593,22	Ar I K II Ti II Xe I	
3603 ,96 Kr III 3603 ,95 C I 3603 ,905 Ar II	3592,48 3592,00 3591,67 3590,862	Cs Xe III Xe I C II	4 5 1 8
3603 ,72 Cl II 40 3603 ,72 F II 3603 ,53 C I	3590,63 3590,47 6 3590,465 2 3589,88	F II Ne II Si III Xe II	7 2 20 1
3603,44 C I 3603,2068 Fe I 1 3602,852 Cs	1 3589,657	C II Kr II F II Fe I Ar I	9 70 6 8 2
3602 ,227	2 2 3588,915 3588,62 3588,448	C II Xe II Ar II Ar I	5 6 30 3
3601,916 Al III 3601,89 Xe III	1 3587,980 6 3587,78 4 3587,657 3587,441	F II Cl II C II Al II	5 1.2 6 7
3600,73 Cs	0 3587,42 7 3587,405 0 3587,327 5 3587,270	F II He I Al II He I	$\begin{array}{c} 3\\2\\2\\10 \end{array}$
3599,90 Kr II	3 3587,176 3587,13 3587,130	Al II F II Ti II	1 3 12
3599,448 He I 3599,314 He I 3599,21 Kr II	2 3587,02 5 3586,9861 25 3586,908	Al II Xe I Fe I Al II Al II	$\begin{array}{c} 8 \\ 4 \\ 30 \\ 3,5 \\ 2 \end{array}$
3598,97 Cs 3598,714 Ti I 3598,704 F II 3598,04 Kr III	3586,60 3586,546 3586,25 1 3586,114 10 3586,04	K II Al II Kr II Fe I Fe III	2 9 12 10 9
3597,73 Cs 3597,50 Al II 3597,430 Cs 3596,86 Kr II	6 2 3585,809 3585,7068 10 3585,3206 2 3584,977 60 3584,6627	C II Fe I Fe I C II Fe I	3 20 30 7 8
3595 ,917 F II 3595 ,82 Cl II 3595 ,46 C I 3595 ,14 C I 3594 ,636 Fe I	5 8 3583,64 3582,6971 0 3582,48 0 3582,362 3 3581,763	Xe III Ar I Kr III Ar II C II	80 30 5 20 3
3594,18 Ne II 3594,103 F I 3594,023 Cu I 3593,640 Ne I 3593,597 N II	6 3581,703 6 3581,608 30 3581,3 300 3581,495 5 3580,050 3579,95	Ar II Cs Fe I Si III Kr III	18 4 250 3 2

λ	Symbol	I	λ	Symbol	1
3579 ,69 3578 ,357 3578 ,25	Xe III Ar II Ti I	100 5 3	3562 ,09 3561 ,75	Kr III Xe II	2 1
3577 ,60 3577 ,23	Kr II F II	4 2	3561 ,575 3561 ,38 3561 ,23	Ti II Xe III Ne II	3 40 4
3576 ,611 3576 ,570 3576 ,44	Ar II Cs II Ti IV	$25 \\ 2 \\ 4$	3561 ,031 3560 ,68	Ar II Cl III	20 8
3576 ,00 3575 ,761	Cl II Ar II	15 1	3560 ,42 3559 ,68 3559 ,508	O IV Cs II Ar II	1 10 25
3574 ,92 3574 ,64 3574 ,346	F 1I Ne II F I	3 5 1,5	3558,5170 3558,51	Fe I Ti I	30 6
3574 ,245 3574 ,23	Ti I Ne II	8	3557 ,84 3556 ,90 3556 ,906	Ne II O III Ar II	4 1 7
3573 ,737 3573 ,69 3573 ,24	Ti II Cl III Cs	20 2 4	3556 ,883 3556 ,0076	Fe I Ar I	6 100
3572 ,68 3572 ,2960	Kr II Ar I	15 300	3555 ,92 3555 ,54 3554 ,929	Xe I Kr II Fe I	1 8 40
3571 ,996 3571 ,68 3571 ,26	Fe I F II Ne II	$egin{array}{c} 6 \ 3 \ 4 \end{array}$	3554 ,547 3554 ,415	He I He I	1 7
3570 ,746 3570 ,258	Ar II Fe I Fe I	1 20 100	3554 ,39 3554 ,3056 3554 ,04	Ne II Ar I Xe I	1 300 10
3570,0996 3569,940 3569,68	Ar II Kr II	3 2 8	3553 ,741 3553 ,58	Fe I Ar I	6 15
3569 ,673 3569 ,47 3569 ,28	Si III F II Cs	o 2 4	3553 ,49 3553 ,366 3553 ,35	Kr II Mg II Cl III	20 8 1
3568,53 3568,04 3567,72	Ne II Cl II Kr III	$6 \\ 20 \\ 15$	3552 ,13 3552 ,00	Xe III Al II	5() 1
3567,6562 3567	Ar I O IV	300	3551 ,52 3550 ,030 3549 ,86	Ne II Ar II Xe I	1 5 10
3566 ,131 3566 ,11 3566 ,00	Cu I Cs II Ti II	2 5 2 6	3549 ,516 3549 ,44	Mg II Kr I	7 1
3565 ,84 3565 ,3807	Ne II Fe I	4 60	3549 ,42 3548 ,742 3548 ,71	Kr III Cu II Kr II	20 3 6
3565 ,326 3565 ,111 3565 ,033	Ti II Cs II Ar II	3 10 12	3548,69 3548,519	Xe II Ar II	2 15
3564,33 3564,30	Ar II Xe II	7	3548 ,5 3547 ,029 3546 ,6	FII Til FII	0,5 15 0
3564 ,2955 3564 ,23 3563 ,87	Ar II Kr III F II	100 100 0	3546 ,46 3546 ,433	Kr I Cu I	3 15
3563 ,80 3563 ,36	Xe I O IV	$\frac{3}{2}$	3546 ,29 3546 ,22 3546 ,06	Xe II Ne II F II	! 1 I
3563 ,2864 3563 ,11 3562 ,979	Ar I Si III He I	100 2 4	3545 ,842 3545 ,62	Ar II N I	18 2
3562,9551 3562,50	Ne I Xe II	15 1	3545 ,597 3545 ,5 3544 ,963	Ar II F II Cu I	18 0,5 I25
3562 ,194 3562 ,15	Ar II K II	7 4	3544,54	Kr II F II	30 3

λ	Symbol	I	λ	Symbol	I
3544 ,14 3543 ,149 3542 ,90 3542 ,51 3542 ,33	Kr II Ar II Ne II Ti I Xe III	30 7 7 3 50	3526 ,13 3525 ,939 3525 ,161 3524 ,78 3524 ,231	Cl II Si III Ti I Kr III Cu I	30 9 3 5 1250
3542 ,28 3542 ,078 3541 ,937 3541 ,765 3541 ,45	Ne II Fe I F II F II Cs	2 15 8 9 4	3522,883 3522,83 3522,72 3522,6747 3522,14	F II Xe III Ne II Kr I Cl II	6 80 1 15 40
3541,44 3541,086 3540,9538 3540,118 3539,96	Ti IV Fe I Kr I Fe I Xe III	3 15 5 3 20	3521 ,977 3521 ,555 3521 ,263 3521 ,2630 3521 ,11	Ar II Ar II Ar II Fe I Kr III	4 1 12 25 4
3539,94 3539,5416 3539,45 3538,813 3538,474	Ne II Kr I F II Mg II F II	0,5 5 1 8 3	3520,9 3520,4714 3520,253 3520,031 3519,996	O IV Ne I Ti II Cu I Ar II	1000 20 500
3538,08 3537,99 3537,75 3537,35 3537,20	Xe II Ne II Ca III Xe I Kr III	2 3 7 1 2	3518,31 3518,15 3517,90 3517,894	C I Cs Xe I Ar II	15 0 6 2 6 5
3536 ,838 3536 ,809 3536 ,61 3536 ,557 3535 ,408	F II He I Xe I Fe I Ti II	7 3 1 15 40	3517, 37 3517, 317 3517, 039 3516, 92 3516, 838	Kr II He I Cu I O II Ti I	5 2 100 0 3
3535 ,35 3535 ,319 3535 ,162 3534 ,972	Kr II Ar II F II Mg II	50 18 4 7	3516,03 3515,602 3515,1900 3514,80	Cs Mg I Ne I C I	4 4 200 2 8
3534 ,61 3533 ,97 3533 ,868 3533 ,746 3533 ,48	Xe II O II Ti II Cu I Xe I	$\begin{array}{c} 00 \\ 2 \\ 500 \\ 2 \end{array}$	3514,58 3514,55 3514,388 3514,18	Xe II Kr III Ar II Ar III	15 20 6 6
3533 ,364 3533 ,202 3533 ,043 3532 ,65 3532 ,233	Cs Fe I Na II N I Ar II	6 10 10 4 1	3513,88 3513,8196 3513,69 3513,22	K III Fe I Cl II Cl II	5 30 12 35
3531 ,376 3531 ,178 3530 ,75 3530 ,491	Cs II Ar II K II He I Cu I	4 2 7 5 2000	3512 ,512 3512 ,121 3511 ,985 3511 ,8963 3511 ,835	He I Cu I Cu I Kr I Cu I	$\begin{array}{c} 4 \\ 650 \\ 10 \\ 4 \\ 50 \end{array}$
3530 ,383 3530 ,21 3530 ,03 3529 ,820 3529 ,53	Xe II Cl III Fe I K II	3 9 6 3	3511,69 3511,626 3511,12 3510,840 3510,7207	Ar III Ti I Ar III Ti II Ne I	5 3 8 60 50
3528,51 3527,797 3527,482 3527,42 3526,1676	K II Fe I Cu I Kr II Fe I	1 4 500 3 15	3509,844 3509,783 3509,39 3509,33 3509	Ti II Ar II Cl II Ar III O VI	3 10 40 5

λ	Symbol	I	λ	Symbol	I
3508,94	Cl II	12	3497 ,89	Xe III	4
3508,88	Xe II	20	3497 ,8420	Fe I	40
3508,42	Xe I	2	3497 ,45	Kr II	3
3507,84	Kr I	3	3497 ,13	Kr III	10
3507,42	Kr III	200	3497 ,108	Fe I	10
3507,407	Cu I	5	3497,10	Ar III	4
3506,74	Xe I	5	3496,86	Xe I	1
3506,66	Kr I	3	3496,27	O II	1
3506,643	Ti I	8	3495,9900	Kr I	10
3506,56	Xe II	15	3495,775	Ar II	1
3506 ,4807 3506 ,02 3505 ,763 3505 ,614 3505 ,508	Ar I O II F II F II F II	30 0 4 15 6	3495 ,754 3495 ,44 3495 ,2879 3495 ,156	Ti I O II Fe I Ca II	6 0 8 1
3505 ,44 3504 ,890 3504 ,85 3504 ,25	Cl II Ti II Cs Xe II	12 80 4 1	3494 ,672 3494 ,66 3493 ,57 3493 ,474 3493 ,280	Fe II O II Kr II Fe II Ti I	$\begin{array}{c} 5 \\ 00 \\ 2 \\ 10 \\ 4 \end{array}$
3503,8981 3503,67 3503,61 3503,58 3503,25	Kr I Cs Ne II Ar III Kr II	15 4 5 15 50	3493 ,2747 3493 ,215 3493 ,04 3492 ,80	Ar I F II Kr II Kr III	20 5 8
3503,45	Xe II	15	3492 ,39	Ti II	3
3503,095	F II	12	3492 ,24	O IV	0
3502,954	F II	8	3491 ,538	Ar II	25
3502,859	F II	4	3491 ,243	Ar II	20
3502,70	Ar III	$ \begin{array}{c} 6 \\ 20 \\ \hline 2 \\ \hline 20 \end{array} $	3491 ,053	Ti II	10
3502,5537	Kr I		3490 ,884	Ar II	8
3502,379	He I		3490 ,685	He I	2
3502,2	O IV		3490 ,5749	Fe I	100
3501,77	Xe II		3490 ,50	Ar I	3
3501 ,76 3501 ,67 3501 ,562 3501 ,529	Fe III O II F II Cu I	8 00 5 3	3489,84 3489,739 3488,858 3488,65 3488,59	O IV Ti II Cu I Kr II Kr III	1 2 100 30 100
3501,487 3501,416 3501,251 3501,2154 3500,58 3500,5	F II F II Cu I Ne I Ar III O II	3 10 5 200 5 00	3488 ,188 3488 ,18 3487 ,723 3487 ,598 3487 ,566	Ar II O II He I Ca I Cu I	1 0 2 12 60
3500,36	Xe II	30	3487 ,49	Kr II	7
3500,340	Ti II	2	3487 ,318	Ar II	3
3500,324	Cu I	50	3486 ,911	Si III	15
3500,28	Fe III	7	3485 ,689	Ti I	6
3499,67	Ar III	12	3485 ,3418	Fe I	7
3499,59	Fe III	7	3485,23	Xe II	1
3499,481	Ar II	7	3485,08	Kr III	1
3499,099	Ti I	8	3484,96	N IV	13
3498,938	Cu I	3	3484,12	Ar III	3
3498,92	Kr II	2	3483,80	Ti II	4
3498,645	He I	3	3483,761	Cu I	1250
3498,50	Kr II	4	3483,17	Ar I	14
3498,31	Ar III	6	3482,99	N IV	5
3498 ,0632	Ne I	100	3482 ,628	Al I	5
3498 ,063	Cu I	125	3482 ,21	Xe II	2

λ	Symbol	I	λ	Symbol	I
3481,96 3481,675 3481,614 3481,11 3481,11 3481,11 3480,75 3480,555 3480,555 3480,511 3480,063 3479,82 3479,82 3479,806 3479,53 3479,25 3479,11 3478,918 3478,71 3478,236 3477,89 3477,69 3477,81 3476,749 3476,7036 3476,452 3476,2 3475,999 3475,973 3475,68 3475,651 3475,4511 3475,31 3475,26 3474,55 3474,578 3473,621	Ne II Ti I Cu I Ti I K II K III K III K III Ar III Ti I Ar II Cs I Cl II Al I Ne II Cr II Kr II He I Ti I Ne II Ti I Ti I Ti II Cs I Ar II Fe I Fe I Fe I Fr II Fe I Fr II Fe I Fr II Fr II Cu I Cs II Fr II	6 3 5 3 6 6 2 20 12 9 50 30 5 1 4 1 3 2 6 5 3 15 100 20 40 3 0 750 2 2 6 70 3 — 1 1 7 8 70 5 3 20 2 5	3470,81 3470,42 3470,264 3470,05 3469,81 3469,81 3468,680 3468,476 3468,32 3468,19 3467,260 3466,5781 3466,5781 3466,343 3466,24 3466,15 3465,62 3465,787 3465,562 3465,41 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3465,401 3461,496 3461,496 3461,36 3461,36 3461,26 3461,26 3461,0785 3460,5235 3460,13 3460,09 3460,09 3460,08 3459,98 3459,52 3459,428	O II O II O II Kr II Kr II Cs Xe I Fe II Ca I K III Xe III Ti I Xe III O III Ne I Ar II Cu I O III Kr II Cu I Cs Ar I Ne I Xe II Ti II Kr II Cu I Cs Ar I Ne I Xe II Ar II Cu I Cs I O III	8 5 4 30 4 4 8 8 4 6 40 6 25 0 200 8 25 2 60 4 3 6 50 4 2 100 1 10 1 5 6 6 6 1 3 2 20 2 100 300 100 2 50 8 2 2 50 2 5 2 5 6 6 6 1 6 6 6 1 6 6 6 6 1 6 6 6 6 1 6
3472,364 3472,61 3472,5706 3472,36	F II Ar III Ne I Xe I	6 6 500 4	3459,38 3459,185 3459,07 3458,50	Ne II Cs II O II C I	2 15 0 1
3472 ,141 3471 ,818 3471 ,748 3471 ,600 3471 ,3460	Cu I He I Cu I Ar II Fe I	200 1 2 3 6	3458 ,216 3458 ,020 3457 ,99 3457 ,850	Al I Ti I O II Cu I K II	6 3 1 750 2
3471 ,32 3471 ,02 3470 ,92	Ar III Kr III Cs	9 3 4	3457,85 3457,81 3457,494 3457,18	Ar I Ti I Cs	3 4 4

	<u> </u>				
λ	Symbol	I	λ	Symbol	I
3457,16 3456,928 3456,87 3456,68 3456,661	Ne II Fe II Kr I Ne II Ti I	4 5 3 4 6	3444 ,23 3444 ,10 3443 ,88 3443 ,8775	Xe III O III Cs Fe I	60 5 4 40
3456 ,390 3455 ,48 3455 ,12 3454 ,944 3454 ,90	Ti II Cs O III Ar I Kr I	20 4 5 20 1	3443,83 3443,70 3443,644 3443,640 3443,59 3443,29	Xe I Ne II Ti I Al I N IV Kr II	1 2 5 9 3 5
3454,90 3454,83 3454,70 3454,686 3454,25	O III Ne N IV Cu I' Xe III	2 1 2 200 70	3442 ,86 3442 ,66 3442 ,58 3442 ,5 3442 ,12	Kr III Xe I Ar I F II Ne II	6 3 10 0 1
3454,4942 3454,098 3453,8 3453,616 3453,46 3453,31	Ne I Ar II F II Mg I Kr II O II	100 12 0 3 3 0	3440,9899 3440,80 3440,75 3440,6069 3440,507 3440,39	Fe I Ne II Xe II Fe I Cu I O III	75 1 4 150 250 4
3453,10 3452,657 3452,657 3452,470 3452,32	Ne II Al I Ca II Ti II Ar I	3 2 1 4	3440 ,35 3440 ,37 3440 ,05 3439 ,46 3439 ,347 3439 ,305	Si III K II Kr III Al I Ti I	5 7 100 6 8
3452,2760 3451,9166 3451,33 3450,94 3450,7641	Fe I Fe I O III O III Ne I	10 10 1 4 50	3439 ,242 3439 ,094 3438 ,97 3438 ,88 3438 ,04	Si III Ar II Ne II Kr II	3 1 2 3 8
3450,36 3450,332 3450,3304 3449,52 3448,71	Cs Cu I Fe I Ar I Kr III	6 750 10 2 10	3438 3437 ,73 3437 ,147 3437 ,14	Ar III O VI Xe II N II N I	- 3 9 4
3448,281 3448,14 3448,05 3447,98 3447,7022	Ar II Cl II O III O II Ne I	1 4 0 1 200	3436 ,57 3436 ,57 3436 ,543 3436 ,48 3436 ,112	F II F III Cu I Xe II Fe II	4 4 5 1 5
3447,590 3447,586 3447,375 3447,290 3447,2797	Cu I He I K I Ar II Fe I	3 15 10 1	3435 ,78 3435 ,773 3435 ,40 3434 ,1423 3434	Xe III Ar II Ti I Kr I O VI	4 1 3 8
3447,22 3446,85 3446,73 3446,51	O III Kr III O III Kr II	1 8 2 50	3433 ,972 3433 ,69 3433 ,369 3433	Cu I F II Ar II O VI	3 2 1
3446,372 3446,34 3445,20 3445,1508 3444,865	K I Xe II N IV Fe I Al I	11 25 2 20 6	3432,585 3432,49 3431,737 3431,7217 3431,45	Ar II Xe II Ar II Kr I Kr I	3 1 2 20 2
3444 ,409 3444 ,403 3444 ,306	Mg I Ti I Ti II	$\begin{array}{c} 2\\3\\30 \end{array}$	3431 ,03 3430 ,990 3430 ,60	Kr II Ar II O III	8 3 4

λ	Symbol	I	λ	Symbol	I
λ 3430,417 3430,4 3430,03 3429,91 3429,617 3429,49 3428,956 3428,916 3428,83 3428,76 3428,67 3428,1948 3427,71 3427,42 3427,42 3427,13 3427,1213 3426,862 3426,34 3426,27 3426 3425,57 3424,9433 3424,43 3424,25 3423,9120 3423,73 3422,6583 3422,10 3421,83 3421,83 3421,83 3421,83 3421,83 3421,83 3420,61 3420,41 3420,166	Ar II Cs Ar III Kr II Ar II Cs II Ti I Al II Kr III Ne II O III Fe I Kr II O III Kr II O VI O IV Kr I Ar IV Fe I Ar III Ne I Kr II Cu I K II K III K III Cu I K III K III Cu I Cu I Cu I	9 4 2 3 7 3 4 6 10 5 3 8 30 3 2 20 6 2 2 - 0 15 - 10 9 50 20 7 15 4 4 8 6 40 3 0	3416,560 3416,45 3416,021 3415,993 3415,80 3415,29 3414,82 3414,663 3414,663 3414,462 3414,017 3413,71 3413,71 3413,339 3413,1339 3413,1339 3413,137 3412,80 3412,67 3412,04 3411,76 3411,66 3411,76 3411,66 3411,38 3411,313 3410,82 3409,92 3409,89 3409,89 3409,89 3409,89 3409,89 3409,89 3409,89 3409,89 3409,89 3409,49 3409,49 3409,49 3409,413 3409,02	Symbol Ar II F II Fe II Ti I Cu I O III Ne II Kr II F II Ar II Cu I O IV Ar III Cu I Xe II Fe I Ne II F II	1 1 4 5 5 200 3 2 10 5 4 5 1 6 200 6 15 7 10 1 1 2 4 5 3 3 1 10 1,5 5 2 6 4 2 8 1 3
3420,00 3419,87 3418,512 3418,51 3418,37 3418,11 3418,007 3417,9031	Xe I O II Fe I Ar I Xe I Cs Ne I Ne I	8 2 2 10 3 2 6 50 500	3408,97 3408,68 3408,612 3408,13 3408,127 3407,4611	Kr I F II Ar II O III N II Fe I	2 1,5 2 1 5
3417,8428 3417,71 3417,68 3417,49 3417,21	Fe I Ne II Ar I Ar III F II	12 5 4 7 4	3407,38 3407,205 3406,88 3406,83 3406,8021 3406,626	O II Ti II Ne II F II Fe I Cs	7 3 5 1 6
3417,04 3417,02 3416,957 3416,87 3416,80 3416,76 3416,58	Xe II F II Ti II Ne II Ar I F II K II FII	1 6 2 4 5 1 2 4	3406,56 3406,361 3406,298 3406,1804 3405,980 3405,97 3405,89 3405,74	FII CII ArII Ar I FII OIV CI II OIII	$ \begin{array}{c} 2 \\ 2 \\ 3 \end{array} $ $ \begin{array}{c} 30 \\ 4 \\ \hline 3 \\ 2 \end{array} $

λ	Symbol	I	λ	Symbol	I
3405, 16 3405, 094 3404, 77 3404, 66 3404, 3557 3404, 24 3403, 89 3403, 66 3403, 58 3403, 107 3402, 79 3402, 422 3402, 262 3402, 262 3401, 53 3401, 5200 3401, 40 3400, 79 3400, 15 3400, 162 3400, 110 3400, 07 3399, 983 3399, 71 3399, 37 3399, 37 3399, 37 3399, 37 3399, 37 3399, 37 3399, 37 3399, 37 3397, 90 3397, 50 3396, 63 3396, 70 3396, 83 3396, 70 3396, 85 3396, 70 3396, 85 3396, 70 3396, 85 3396, 70 3396, 85 3396, 70 3396, 85 3396, 70 3396, 70 3396	Kr II Ti I Ne II Cu I Fe I C II K II Cu I K II C II C II Cu I Kr II Ti II Fe I Kr I Kr I Kr I Ti II Fe I F II Ti I Fe I F II F II F II F II F II F II F	80 5 4 125 6 1 6 8 1 3 4 5 2 8 5 2 2 3 2 2 3 3 2 4 5 1 3 4 5 2 3 2 3 4 5 6 6 6 7 7 8 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1	3392 ,89 3392 ,7812 3392 ,7813 3392 ,6540 3392 ,63 3392 ,31 3392 ,3058 3392 ,146 3391 ,86 3391 ,85 3390 ,682 3390 ,56 3390 ,29 3390 ,29 3390 ,25 3389 ,854 3389 ,67 3389 ,15 3388 ,67 3388 ,67 3388 ,755 3388 ,755 3387 ,834 3387 ,600 3387 ,600 3388 ,755 3388 ,755 3388 ,756 3388 ,756 3388 ,756 3388 ,761 3388 ,761 3388 ,760 3388 ,761 3388 ,760 3388 ,761 3388 ,761 3388 ,760 3388 ,761 3388 ,761	Cl III Ar I Ne II Ti I Fe I K II Ar I Fe I Cu I Ar IV Ar III Ti I Ne II O IV Ar I O II Ar I Kr II Cu I Ar II Kr II Cu I Xe II Ti II Ar I Cl III Ti II Ar I Cl III Ti I Cu I Xe II Ti II Ar I Cu I Xe II Ti II Cu I Xe II Ti II Ti I Cu I Xe II Ti I T	8 100 5 10 15 3 3 8 2 8 15 10 2 3 8 20 5 6 20 8 10 6 20 12 8 2 50 20 6 7 2 2 5 40 12 6 2 15 4 3 6 15 4 0 8 2 125 1 3 15
3393,45 3393,40 3393,35 3393,25	Cl III F II Ar IV Cs	$\begin{bmatrix} 8\\1\\\hline 3 \end{bmatrix}$	3382,18 3382,133 3381,49 3381,421	Fe III Ar II Ar I Cu I	6 3 20 200

			n .	1	, -
λ	Symbol	I	λ	Symbol	I
3381 ,34 3381 ,33 3381 ,28 3381 ,124 3381 ,11 3381 ,063 3380 ,717 3380 ,62 3380 ,278 3380 ,1117 3379 ,961 3379 ,963 3379 ,577 3379 ,458 3379 ,39 3379 ,29 3379 ,216 3379 ,02 3379 ,02 3379 ,02 3379 ,02 3379 ,02 3379 ,02 3378 ,685 3378 ,512 3378 ,442 3378 ,485 3377 ,706 3377 ,706 3377 ,706 3377 ,44 3377 ,23 3377 ,44 3377 ,23 3377 ,44 3377 ,23 3377 ,44 3377 ,23 3377 ,44 3377 ,485 3377 ,44 3377 ,485 3377 ,485 3377 ,44 3377 ,577 3377 ,485 3377 ,485 3377 ,485 3377 ,44 3377 ,577 3377 ,485 3377 ,496 3377 ,496 3378 ,460 3374 ,953 3374 ,77 3374 ,953 3374 ,77 3374 ,953 3374 ,77 3374 ,953 3373 ,842 3373 ,842 3373 ,842 3373 ,842 3373 ,842 3373 ,594	Xe II O IV O IV Cu I Kr II Ar II Cu II K II Ti II Fe I Cu I Cu I Ar II Ar II Ar II Fe I I I I I I I I I I I I I I I I I I I	1	3372,88 3372,800 3372,68 3372,24 3372,208 3371,85 3371,447 3371,412 3371,38 3370,925 3370,7852 3370,457 3370,436 3370,436 3370,34 3370,23 3369,9069 3369,8076 3369,549 3369,549 3369,549 3369,549 3369,549 3367,65 3367,81 3367,65 3367,81 3367,65 3367,81 3367,65 3367,965 3366,72 3366,72 3366,72 3366,72 3366,72 3366,72 3366,765 3367,965 3367,965 3367,965 3367,965 3367,20 3367,65 3367,81 3367,65 3367,81 3367,65 3367,20 3367,65 3367,20 3367,65 3367,20 3367,65 3367,81 3367,65 3367,20 3367,65 3367,20 3367,65 3367,20 3367,65 3367,20 3367,65 3367,20 3367,65 3367,81 3367,65 3367,81	Ar I Ti II Ca III F III Ti II Ne II O II Ti I Cu II O IV Ar II Fe I Xe III Cu II Ti I Xe I O II Ne I Ne I Fe I O III Ti I Ca III Ti I Ca III Ti I Cu II	3 100 8 1 10 4 2 80 8 4 8 10 4 30 40 1 00 700 500 8 00 2 1 30 35 1 7 6 00 300 6 5 1 8 7 8 7 8 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9
3373 ,49 3373 ,4823	F II Ar I	$\begin{array}{c} 5 \\ 300 \end{array}$	3361 ,90 3361 ,835	N III Ti I	10

λ	Symbol	I	λ	Symbol	I
3361,752 3361,74 3361,28 3361,263 3361,263 3361,213 3361,051 3360,891 3360,87 3360,63 3360,15 3358,96 3358,8 3358,74 3358,72 3358,49 3358,49 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,71 3358,32 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3358,47 3357,58 3357,98 3357,58 3357,98 3357,58 3357,49 3356,51 3356,51 3356,51 3356,35 3355,98 3355,98 3355,98 3355,98 3355,98 3355,98 3355,47 3355,2287 3355,50 3354,474 3354,350 3354,474 3354,31 3354,29 3353,88 3353,78 3353,88 3353,78 3353,88 3353,78 3353,466 3353,39	Symbol Ar II Kr I C II Ar III Ti I Ti II C II Fe III Ne II O II Ar I Xe I Cs Cu I N III Ti I F III Ti I Cu I Xe I Xe III Kr II Cou I Xe II Ne II F III Cou I Xe II Ne II Cou I Xe II Ne II Cou I Xe II Cou I	6 2 6 7 40 125 8 10 3 6 5 00 10 1 4 2 1 15 8 4 4 10 2 2 1 3 6 7 60 10 60 2 2 2 2 2 3 1 6 7 6 6 7 6 6 7 7 8 8 7 8 7 8 8 7 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8	3350,361 3350,209 3350,07 3349,76 3349,463 3349,445 3349,399 3349,279 3349,11 3349,035 3348,825 3348,63 3348,535 3348,63 3348,735 3348,70 3347,694 3347,70 3347,694 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,50 3347,494 3347,70 3346,717 3346,41 3345,88 3345,73 3345,49 3345,32 3345,00 3344,97 3344,97 3344,97 3344,72 3344,513 3344,43 3344,26 3344,004 3343,770 3343,743 3342,77 3342,48 3342,454	Symbol Ca I Ca I Ca I Cl II Xe III Cu II Cs Ti II Ci II Ti II Ti II Ti II F II Kr III O IV O III Fe I Fe III Ar II Ca II Ti II Si III F II Ne II Kr I Cs I Xe II Cu I O III Cu I Ne II Kr II Cu I C	25 25 24 42 5 10 425 450 475 10 15 15 0,5 10 2 2 6 8 1 2 30 3 1 15 2 0,5 1 4 2 30 8 5 1 1 2 1 2 1 3 1 4 2 1 3 1 3 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5
3353,302 3352,937 3352,20	CIII CII Ti I Ar I	125 2 6 1	3342 ,454 3342 ,151 3341 ,905 3341 ,875	Ti I Fe I Ti I	6 5 50
3352 ,11 3352 ,071 3352 ,044	Ar III Ti II Cu II	5 8	3341 ,875 3341 ,746 3341 ,507 3340 ,74	Ti II Ar II Ar II O III	100 6 3 6
3351,93 3351,744 3351,456 3350,933 3350,99 3350,68 3350,44	Kr III Ne I Al II Ar II O III O III Xe II	100 25 3 12 4 3 6	3340,74 3340,574 3340,5666 3340,42 3340,344 3340,06 3340,04 3339,819	Cs Fe I Cl III Ti II Xe III Xe I Si II	10 6 9 35 10 1 500

			 		·
λ	Symbol	I	λ	Symbol	I
339,38 339,084 3338,98 3338,98 3338,828 3338,80 3338,647 3337,85 3337,67 3337,6664 3337,20 3337,17 3337,116 3336,78 3336,674 3336,12 3336,12 3335,7699 3335,7699 3335,7699 3335,16 3334,87 3334,47 3334,47 3334,47 3334,47 3334,26 3334,201 3333,84 3333,64 3333,139 3333,00 3332,49 3332,47 3332,47 3332,47 3332,416 3331,613 3331,65 3331,613 3331,613 3331,310 3330,78	Fe III Cu II Xe III Cu II Ar II Xe II Cu II Ti II Cu I K II Fe I Cl II Kr I Ar III O III Mg I Cl III Kr II Ne II Fe I Cu I Ti II Kr II Ne III Kr II Ne III Kr III Ne III Kr III Ne III Kr III Ne III Ne III Ne III	10 3 25 3 5 4 10 2 1500 1 6 3 1 2 3 20 5 25 2 4 400 40 40 410 1 1 4 2 400 300 40 100 100 100 100 100 100 10	3327,34 3327,16 3326,762 3326,16 3326,13 3325,812 3325,5006 3325,5006 3325,462 3325,328 3325,229 3325,155 3324,78 3324,754 3324,5385 3324,5385 3324,5 3323,803 3323,75 3323,735	Symbol Ar III Ne II Ti II O III Kr II Cu I Cu II Kr III Fe I Cu I Ti I Ti I Ar IV Ti I N II Fe J Cs Ar II Fe I Cu II Ar I Ti I Ar I Ti I Ti I Ar I Ti I Ti I Ar I Ti I Ar II Fe II Cu II Ar II Fe II Cu III Ar II Ti II Cs Fe I Ar I K III Ti II Ti II Ti II Ti II Ti II Ne II Ar II Ne II Ne II	1 4 5 20 0 1 3 8 200 100 4 3 3 3 4 5 4 4 2 0 ,5 3 4 7 7 7 5 9 8 7 7 7 8 8 7 8 7 8 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8
3330,76 3330,40 3330,33 3330,314 3329,919	Kr III O III Cs N II Mg I Fe III	60 4 4 5 17	3320 ,14 3320 ,06 3319 ,75 3319 ,682 3319 ,53 3319 ,3446	Cl II Ar I Ne II Cu I Xe III Ar I	30 3 3 150 2 300
3329,704 3329,636 3329,455 3329,428 3329,20 3329,12 3329,06 3328,8667 3328,730	N II Cu I Ti II Cs II Ne II Cl II Cl III Fe I N II	5 225 70 10 4 150 8 5 7	3318,362 3318,098 3318,032 3318,024 3317,825 3317,54 3317,44	Ti I N II Na II Ti II Ar II Ar I Xe III	4 5 4 10 3 1
3328,00 3327,685 3327,46	Kr I Na II Xe II	2 4 15	3317 ,218 3317 ,140 3317 ,121 3316 ,86	Cu I Cu II Fe I Cl II	750 5 4 50

						1
_	λ	Symbol	I	λ	Symbol	I
	3316,39 3316,279 3315,72 3315,614 3315,498 3315,44 3315,324 3314,889 3314,7420 3314,60 3314,523 3314,49 3314,422 3314,49 3314,422 3314,30 3314,422 3314,30 3314,539 3314,48 3313,48 3313,48 3313,48 3313,48 3313,48 3313,48 3311,52 3311,63 3311,52 3311,63 3311,52 3311,63 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 3311,52 3311,30 33	Xe II Cu II Kr II Al II Cs Cl II Ti II Al II Xe III Fe I Ne II Ti I Ar I Ti I Xe III Cs I O IV Xe II Al II Cs I O IV Xe II Al II Cs I II Ti I Cu I Ti I Xe II Fe I Ne II Ar II Cu I Ti I Xe II Cu I Ti I Xe II Cu I Ti I Xe II Cu I Ti I Cu I Cl II Ar II Ti I Cu I	6 20 15 1 10 100 100 10 2 10 7 1 8 2 10 1 5 - 2 3 10 3 15 5 5 2 1 4 50 3 15 8 1 1 3 3 4 3 6 4 15 2 5 8 1 10 20 2500 50 9 10 10 6	3305,22 3305,15 3304,950 3304,75 3303,89 3303,72 3303,516 3302,979 3302,787 3302,54 3302,369 3302,28 3301,71 3301,60 3301,56 3301,56 3301,41 3301,56 3301,41 3301,346 3301,228 3300,95 3300,885 3300,95 3300,885 3300,95 3300,885 3300,444 3300,39 3300,48 3299,413 3299,413 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,36 3299,26 3299,36 3299,26 3299,26 3299,36 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,26 3299,36 329,36 329,36 329,36 329,36 329,3	Fe III Li II O II Na II Kr III F II Cs Cu II Na I Kr II Cu II Ti I Fe II Fe II Fe II Fe II Fu II	10 4 6 0 30 6 4 5 18 4 10 19 4 20 5 2 3 2 2 4 3 2 4 6 10 3 2 4 6 10 3 2 4 6 10 10 2 4 6 10 10 10 10 10 10 10 10 10 10
3 3 3.	306 ,498 306 ,45 306 ,445 366 ,354	Fe I Cl II Ar II Fe I	6 40 5 20	3294,37 3294,336 3294,168 3293,921	F II Cu II Cu I Ar II	4 3 5 9
3 3 3	306,534 306,17 305,9719 305,77 305,530	Fe I Fe I O III Cu I	20 7 20 0 4	3293 ,88 3293 ,815 3293 ,641 3293 ,334 3292 ,965	Kr III Cu I Ar II Cu II Cu I	4 2 10 2 450
7.48						

λ	Symbol	I	λ	Symbol	I
3292 ,827	Cu I	650	3279,995	Ti II	4
3292,5910	Fe I	8	3279,97	O III	1
3292 ,393 3292 ,21	Cu I Kr III	125	3279,937	Ar II	4
3292 ,124	Cu II	10	3279 ,815 3279 ,42	Cu I Kr III	$\begin{array}{c} 2000 \\ 2 \end{array}$
3292,078	Ti I	20	3279 ,258	Si III	7
$3292,04 \\ 3292,023$	Fe III Fe I	8 8	3279,25	Ar I	3
3291,441	_	٥ 6	3278,93	Ar I Ti I	$\frac{3}{12}$
3290,9899	Fe I	5	3278 ,922 3278 ,922	Ti II	$\frac{12}{35}$
3290,65	КIJ	5	3278,79	K III	6
$3290,541 \\ 3290,422$	Cu I Cu II	$\begin{array}{c} 1500 \\ 50 \end{array}$	3278 ,734 3278 ,48	Fe I Xe III	4 8
3290,13	O II	5	3278,290	Ti II	30
3289,95	Ar I	3	3278,26 3277,69	Cs O II	4 7
3289,80	Cl III Ar I	$\frac{7}{3}$	3277,346	Fe II	9
$3289,39 \ 3289,347$	Fe II	7	3277,310	Cu I	650
3289,290	Cs I	$\frac{2}{c}$	3276 ,81 3276 ,774	Cl II Ti IJ	40 5
3289,06	KIII	6	3276,606	Fe II	5 5
3288 ,81 3288 ,605	Fe III Cs I	15 4	3276 ,4713 3276 ,39	Fe I Xe III	4 8
3288,575	Ti II	5	3276,33	Si III	10
$3288,428 \\ 3287,92$	Ti II Xe III	$\begin{array}{c} 5 \\ 30 \end{array}$	3276,085	Ar II	3
3287,52	Kr II	2	3276,08	Fe III	15
3287,63	Ti II	40	$3275,776 \\ 3275,72$	Al II Ar I	$\frac{4}{2}$
3287,59	O II	$rac{9}{2}$	3275,68	Cs	4
3287 ,38 3287 ,37	Kr II Al III	1	3275,67	o v	0
3286 ,7541	Fe I	20	3275,639 3275,293	Ar II Ti II	4 3
3286,193	Cu I	$\frac{2}{2}$	3275,20	Ne II	$\begin{array}{c} 3 \\ 2 \\ 4 \end{array}$
$3286,067 \\ 3285,89$	Ca I Kr III	$\frac{4}{30}$	3274,94 3274,661	Xe II Ca I	4 2
3285,89	Xe III	10	3274,220	Na II	2 5
3285,85	Ar III	25	3274 ,047 3273 ,957	Ti I Cu I	5 10000
$3285,603 \\ 3285,25$	Na II Kr III	8 3	3273,537	Fe III	6
3285,10	Ar I	2	3273,52	O II	7
3284,70	Xe III	3	3273 ,316	Ar II	6
3284,5888	Fe I O III	5 4	3272,91 3272,080	Xe II Ti II	$\frac{60}{25}$
3284 ,57 3283 ,74	Ar I	1	3271,652	Ti II	$\frac{25}{25}$
3283,41	ClIII	6 0 , 5	3271,65	Kr III	30
3283 ,114 3282 ,716	Al III Cu I	1400	3271,626	Cs II	20
3282,70	Ar I	1	3271 ,16 3271 ,0014	Ar I Fe I	10 15
$3282,329 \ 3282,1$	Ti II Cs	$\frac{20}{3}$	3270,980	Cs I	1
3282 ,08	Kr II	15	3270,98	O II	7
3281,94	O III	3	3270,79	Ne II	2
3281,703	Ar II Cu II	12 10	$3270,562 \ 3270,477$	Ti I Cs I	$\frac{3}{2}$
3281 ,696 3281 ,300	Fe II	7	3270,474	Ar II	5
3281,26	Xe II	12	3270,456	Si III	6
3280,59	Kr I	1	3269,86	Ne II	3
3280,56	Fe III Xe II	6 8	3269 ,090 3268 ,987	Ca I Ar II	1 5
3280 ,48 3280 ,2613	Fe I	8	3268,96	Xe III	80
,					

					
λ	Symbol	1	λ	Symbol	I
3268,48 3268,314 3268,278 3268,236 3268,08 3267,34 3267,31 3267,22 3267,202 3267,135 3267,05 3266,88 3266,08 3266,08 3265,46 3265,46 3265,45 3265,45 3264,7 3264,33 3264,7 3264,33 3264,7 3264,33 3264,16 3263,982 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,43 3263,12 3263,43 3263,12 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,78 3263,686 3263,572 3263,43 3263,12 3263,06 3262,29 3261,70 3261,596 3261,58 3260,259	Kr III Cs Cu I Fe I Xe II Xe II Ne F III Cs II Xe II Cs II Xe II Cs II Ar I Cu I Cl III Ne Fe I Kr III C' III Ar I F III F II C' III Ar I F III F III C' III Ar I F III F III C' III Ar I F III C' III Ar I F III F III C' III Ar II	100 100 650 5 1 3 5 1 4 30 6 20 1 4 650 30 15 10 0 3 8 150 - 5 3 9 7 5 3 4 4 6 6 6 8 8 8 1 4 6 6 6 8 8 8 8 8 8 8 8 8 8 8 8 8	3257,965 3257,5940 3257,585 3257,10 3256,67 3256,20 3255,890 3255,35 3254,800 3254,3628 3254,250 3253,98 3253,98 3253,98 3253,411 3253,401 3253,401 3253,401 3252,94 3252,94 3252,914 3252,94 3252,914 3252,914 3252,914 3252,914 3252,914 3252,437 3252,220 3251,911 3251,235 3250,56 3250,56 3250,56 3250,469 3250,56 3250,469 3250,34 3249,801	Na II Fe I Ar I Kr II Kr II Kr II Cs Si III Fe I Ti II Si III Fe I F III Si III Fe I F III Cu I Ti II Fe I Na II Cu I Ti II Fe I I I I I I I I I I I I I I I I I I I	6 8 100 1 4 2 8 2 10 7 10 30 3 3 5 4 2,5 7 4 2 40 5 650 30 8 3 6 25 10 10 10 10 10 10 10 10 10 10 10 10 10
3259,32 3259,048 3258,894 3258,81 3258,773 3258,664	Cl III Fe II Ar II K II Fe II Si III	6 10 2 3 10 12	3246,005 3245,69 3245,05 3244,44 3244,192 3244,190	Fe I Kr III Cl III Cl III Si IV Fe I	8 300 2 5 1 5
3258 ,275 3258 ,00 3258 ,00	He I C III Kr I	5 1 1	3244 ,15 3243 ,803 3243 ,724	Ne II Ti I Fe II	5 4 8

λ	Symbol	I	λ	Symbol	1
3243,689 3243.6 3243,513 3243,34 3243,164 3242,86	Ar II O V Ti I Ne II Cu I Xe III	14 - 3 2 1500 100	3231 ,178 3230 ,967 3230 ,78 3230 ,680 3230 ,68	Cu I Fe I Cl III Ar II Kr I	650 10 1 2 2
3242,40 3242,28 3241,984 3241,708 3241,622 3240,44	Ar I Cs Ti II Ar II Si III Kr III	2 10 60 2 15 40	3230,499 3230,211 3230,16 3230,021 3229,91 3229,50	Si III Fe I Ne II Ar II Ar I Ne II	,12 6 5 4 3 3
3240,20 3239,91 3239,664 3239,52 3239,436 3239,3	Kr II F II Ti II Kr III Fe I O V	2,5 30 40 15	3229,397 3229,193 3229,03 3228,8 3228,605 3228,254	Ti II Ti II Xe II O V Ti II Fe I	35 40 4 — 30 5
3239 ,16 3239 ,037 3238 ,83 3238 ,57 3238 ,49 3238 ,47 3238 ,224	Cu I Ti II Cu II O III Ar I Ne Ti I	150 60 5 5 1 1	3227,798 3227,747 3227,2 3226,771 3226,602 3226,57 3226,541	Fe I Fe II Cs Ti II Cu I Kr II Cu I	15 13 4 2 150 5
3238,10 3237,819 3237,402 3237,266 3236,84 3236,809	F II Fe II Fe II Mg I Xe III Ar II	0 8 5 3 25 6	3226 ,129 3226 ,128 3225 ,976 3225 ,973 3225 ,896 3225 ,789	Ca I Ti I Na II Ar II Ca I Fe I	8 12 4 6 8 20
3236 ,573 3236 ,2231 3236 ,122 3235 ,713 3235 ,57 3235 ,21	Ti II Fe I Ti II Cu I Ar I Kr III	70 8 20 650 2 2	3225,698 3225,58 3225,088 3224,99 3224,85	Cu I Ar I Cu I Xe II Kr IV Kr III	5 20 2 45 6 20
3235,175 3234,926 3234,6138 3234,517 3234,491 3234,16 3233,971	Ar II Na II Fe I Ti II Ar I Cs Fe I	3 4 7 75 100 6 12	3224,82 3224,664 3224,241 3223,74 3223,52 3223,519	Ne II Cu I Ti II Kr III Kr II Ti I	4 450 35 3 12 10
3233,954 3233,899 3233,23 3233,054 3233,02 3232,80	Si III Cu I Xe II Fe I Ca III Kr I	$egin{array}{c} 14 \\ 450 \\ 1 \\ 8 \\ 4 \\ 2 \\ \end{array}$	3223,435 3223,01 3223,00 3222,843 3222,741 3222,55	Cu I Si II Kr II Ti II Ti I Cl II	400 20 6 35 3 7
3232,791 3232,791 3232,634 3232,38 3232,280 3232,15	Fe II Ti I Li I Ne II Ti II Kr II	7 3 50 3 30 2	3222,393 3222,3 3222,24 3222,069 3221,625	Ar II O V Kr III Fe I Ar II	$\frac{6}{40}$ 20 7
3231 ,97 3231 .75 3231 ,702 3231 ,315 3231 ,266	Ne II Cl II Fe II Ti II He I	0 12 5 4 3	3221 ,381 3221 ,35 3220 ,65 3220 ,62 3220 ,60	Ti I Cu I Cu I Kr III K II	10 8 8 20 4

	1	<u> </u>		<u> </u>	1
λ	Symbol	I	λ	Symbol	1
3220,44 3220,25 3220,1 3219,581 3219,512 3219,1 3218,77 3218,34 3218,270 3218,21 3218,204 3218,204 3217,99 3217,942 3217,669 3217,64 3217,621 3217,656 3216,76 3216,76 3216,76 3216,284 3216,29 3216,31 3216,284 3216,25 3216,249 3216,203 3216,08 3215,97 3215,940 3215,688 3215,97 3215,940 3215,688 3215,10 3214,67 3214,66 3214,38 3214,45 3215,10 3214,750 3214,67 3214,66 3214,38 3214,240 3214,4040 3213,972 3213,84 3213,70 3213,814 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,314 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814 3213,70 3213,814	Si II Kr II OV Fe I Ti I Cs Cu II Fe III Ti II Ne II O II Si II Ti I Ar II Cu I Kr II O II Ar II O II Fe I Kr II Fe I Fe III Fe I Fe III Fe I Fe II Fe I Fe	10 6 12 8 4 3 6 6 5 8 5 10 6 10 7 30 11 12 38 5 5 5 6 7 7 8 5 10 10 10 10 10 10 10 10 10 10	3210,236 3210,025 3209,930 3209,7 3209,65 3209,64 3209,498 3209,38 3209,34 3209,297 3209,030 3208,99 3208,475 3208,28 3208,231 3207,906 3207,897 3207,655 3207,577 3207,50 3207,50 3207,337 3207,29 3207,12 3207,07 3206,825 3206,72 3206,709 3206,72 3206,709 3206,344 3205,440 3205,46 3204,976 3204,76 3204,976 3204,870 3204,76 3204,996 3204,870 3204,76 3204,870 3204,76 3204,870 3204,76 3204,870 3204,76 3204,870 3204,76 3204,996 3204,870 3204,76 3204,870 3204,76 3204,996 3204,996 3204,996 3204,996 3204,76 3204,870 3204,76 3204,76 3204,870 3204,76 3204,76 3204,996 3204,996 3204,996 3204,996 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,76 3204,996 3204,76 3204,76 3204,76 3204,76 3204,76 3204,996 3204,76 3204,	Fe I Si II Ca I Kr II Cs O IV Cu I Ne II K III Fe I Ti I Ne II Kr II Cu I Ar II Ar II Ar II Ar II Ar II Ti I Kr II Cs Ti I Kr II Cs Ti I Kr II Cs Ti I Kr II Ti I Kr II Ar II Ti I Kr II Ti I Kr II Ti I Ti I Kr II Ti I T	8 200 2 7 10 3 4 3 6 12 4 2 4 40 1400 2 5 5 2 4 10 5 1 1 4 5 1 2 5 5 5 2 15 4 8 6 6 9 4 100 15 10 3 3 200 20 5 10 15 40 20 6 10 6 3 3 5 5
3211,43 3210,89 3210,834 3210,64	Cu I Kr II Fe I Kr II	30 7 10 2	3201 ,17 3201 ,12 3201 ,09 3200 ,95	F II Ar I Cs O III	1 3 4 1
3210 ,554 3210 ,451	Si III Fe II	15 10	3200 ,84 3200 ,685	Ar I N II	$\frac{1}{2}$

λ	Symbol	I	λ	Symbol	I
3200,475 3200,40 3200,39 3199,915 3199,91 3199,53 3199,525 3199,514 3199,43 3199,22 3198,920 3198,7 3198,62 3197,65 3197,65 3197,65 3197,65 3197,65 3196,930 3196,742 3196,51 3196,504 3196,51 3196,504 3196,51 3196,504 3196,51 3195,5 3195,752 3195,777 3195,6 3195,57 3195,50 3195,41 3195,50 3195,41 3194,76 3194,76 3194,76 3194,76 3194,76 3194,76 3194,76 3194,69 3194,61 3194,598 3194,56	Fe I Kr II Ar I Ti I Kr IV O IV Fe I Si II Li II Xe III Cs Ne II Kr II Fe I He I Xe III I Fe II Li II Cs Ar II Cs Ar II Cs III Fe II Li II Fe II Li II Cs Ar II Li II Ti II Cs Ar II Ti II Ti II Cs Ar II Ti II Ar II Ti II Ar II Ti II Ar II Ti II Ar II Ti III Ar II Ti II II	15 50 100 100 2 1 15 200 7 4 2 4 2 2 2 20 20 20 2 25 14 25 10 3 5 3 4 2 2 2 100 5 1 5 4 8 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3191,6599 3191,50 3191,45 3191,21 3190,874 3190,86 3190,58 3190,07 3189,783 3189,52 3189,28 3189,20 3189,11 3189,04 3188,97 3188,821 3188,74 3188,571 3188,369 3187,745 3187,61 3187,60 3187,42 3187,293 3186,741 3186,63 3186,451 3186,63 3186,451 3186,63 3186,451 3186,017 3186,01 3185,99 3185,72 3186,017 3186,01 3185,99 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,729 3185,734 3184,895 3184,895 3184,895 3184,895 3184,895 3184,895 3184,895 3184,895 3184,895 3184,999 3183,108 3182,9798 3182,775 3181,84 3181,70 3181,39 3181,25	Fe I Ar I CI III Kr III Ti II Ne II CI III K II Na II Ti II K II Cs Kr III Cs Kr III Fe I Ar II Ar III He I Ar II Fe II Ar II Cu II Fe II Ar II Cu II Fe II Kr I Cu II	7 2 9 80 30 2 4 5 6 5 2 4 100 20 150 7 3 4 1 6 200 4 2 5 8 11 5 60 5 13 5 1 10 3 2 0 5 40 16 7 15 1 2 8 4 6 10 8 7 3 15 5 5
3192,26 3192,25 3192,22 3192,1	Ti II Si II Cu I Cs	2 50 2 4	3181 ,038 3180 ,98 3180 ,94	Ar II O IV Cs II	12 - 10
3191,994 3191,72	Ti I Ar I	$ \begin{array}{c} 80\\ 2 \end{array} $	3180 ,7562 3180 ,521	Fe I Ca I	5 1

λ	Symbol	I	λ	Symbol	1
3180,43 3180,225 3180,226 3180,164 3179,793 3179,504 3179,332 3179,291 3179,055 3178,63 3178,61 3178,61 3178,61 3178,01 3177,965 3177,965 3177,965 3177,535 3177,19 3176,95 3176,94 3176,16 3176,98 3175,783 3175,67 3175,67 3175,66 3175,67 3175,66 3175,447 3175,30 3175,25 3175,63 3175,447 3175,30 3175,25 3174,59 3174,59 3174,58 3174,125 3174,59 3174,59 3174,59 3174,59 3174,59 3174,59 3174,58 3174,125 3174,09 3173,71 3173,66 3173,58 3172,97 3172,961 3172,961 3172,961 3172,56 3172,56 3172,56 3172,56 3172,56 3172,56 3172,56 3172,56 3172,56 3172,56 3171,403 3171,403 3171,403 3171,403 3171,403 3171,14 3170,93	Cl II Ti II Fe I Fe II Cu II Fe II Cu II Ca II Ti II Na II Kr II Ti II Cs Fe I Fe III Cu II O IV Fe II Kr II Ne II F IV Fe III Mg II Cu I Xe II Ti II Xe II Ti II Xe II Ti II Xe II Ti II Xe II Cl II Xe II Ti II Xe II Cl II Xe II Cl II Xe II Cl II Xe II	7 220 7 5 8 218 3 5 1 3 10 10 10 3 0 10 5 5 15 3 2 10 7 60 40 2 80 12 6 6 3 5 10 1 0 12 10 2 20 3 5 2 150 3 4 6 1 6 10 5 2 3 4 6 1 6 10 5 2 3 4 6 1 6 10 5	3170,346 3170,03 3170,016 3169,854 3169,852 3169,80 3169,73 3169,66 3169,45 3169,66 3169,45 3169,45 3169,30 3169,2 3168,951 3167,87 3167,87 3167,87 3167,87 3167,5762 3167,487 3167,5762 3167,487 3167,5762 3167,487 3165,861 3165,878 3165,878 3165,878 3165,870 3165,70 3165,70 3165,70 3165,467 3165,38 3164,44 3164,94 3164,91 3164,618 3164,46 3164,46 3164,46 3164,46 3164,46 3164,47 3163,535 3163,731 3163,535 3163,731 3163,535 3163,731 3163,535 3163,281 3163,535 3163,281 3163,535 3163,281 3163,535 3163,991 3162,93 3162,800 3162,93 3162,800 3162,70 3162,42 3163,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,949 3161,955 3161,68	Fe II Cl II C II C III C II C III C II C III C II C III	6 15 24 15 34 500 15 17 0 16 34 8 2 11 15 2 3 56 4 2 4 9 4 9 2 6 6 13 8 13 8 13 8 14 6 6 6 6 13 8 13 8 14 8 15 8 15 8 15 8 15 8 15 8 15 8 15
3170 ,925 3170 ,63 54	Ti I Kr II	$\frac{3}{2}$	3161 ,610 3161 ,456	Si III Ar II	8 8
.14					

λ	Symbol	I	λ	Symbol	I
3161,44 3161,369 3161,333 3161,205 3161,16 3160,70 3160,658 3160,06 3160,047 3159,75 3159,75 3159,53 3158,869 3158,64 3157,887 3157,42 3157,42 3157,43 3157,43 3157,45 3156,63 3156,63 3156,629 3156,274 3156,11 3155,670 3155,4 3155,670 3154,82 3154,75 3154,289 3154,266 3154,75 3154,289 3154,206 3154,495 3153,88 3153,782 3153,492 3153,492 3153,4107 3153,206 3152,288 3152,288 3152,29 3152,251 3151,85 3151,85 3151,85 3151,85	Cl II Ar II Cs II Ti II Na II Xe III Fe I Cl II Ar I Cu I Na II Ca II Ca II Fe I Ar IV Ar III Ti II K II C II Fe I Kr III C II Fe I F III Ti II C III Fe II Ti II C III Fe II Ti II C III Ti III C III Ti II C III	20 7 2 25 0 20 10 10 5 25 24 1 0 17 5 6 6 5 2 2 0 8 4 4 4 2 12 4 4 4 2 12 13 14 4 4 4 4 4 4 4 10 10 10 10 10 10 10 10 10 10	3150,538 3150,510 3150,42 3149,92 3149,561 3149,36 3149,36 3149,266 3148,99 3148,6107 3148,57 3148,333 3148,202 3148,033 3147,965 3147,86 3147,701 3147,39 3147,371 3147,268 3146,962 3146,962 3146,821 3146,422 3146,962 3146,962 3146,536 3145,690 3145,697 3145,697 3145,63 3145,536 3144,758 3142,777 3142,757 3142,777 3142,777 3142,777 3142,777 3142,775 3142,444 3142,044 3142,04	Cu II Ar II Ar II Si II Si IV Cu I Cs Na II Xe II Re I Cu I Ar I Ti II F II Cl II Ne I Kr II Si III Ti I Ar I F III Ar I Cs Xe II Fe I Ar II Fe I Ar II Fe I Ar II Fe I Ar II Ti I Ar II Fe I Ar II Fe I Ar II Ti II Kr II Kr III Kr II	3 4 1 20 7 30 10 5 5 100 2 3 5 1 12 5 20 25 1 7 3 8 450 4 3 2 3 1 4 4 4 5 1 6 9 8 3 10 2 6 12 8 3 7 50 0 3
	Kr III Cu I Ar I Fe I Ca I Ne II Cs Cu II	8 40 4 2 6 10	3141,88 3141,670 3141,537 3141,46 3141,35 3141,35 3141,164 3141,16	Kr III Ti I Ti I Cs Kr III Ne II Ca I N IV	3 20 10 15 4 60 3 3 3
3150,93 3150,738 3150,69	Kr If Ca I Xe III	80 4 20	3140,963 3140,782 3140,44	Ar II Ca I Kr II	2 3 3 75

<u> </u>					
λ	Symbol	I	λ	Synibol	I
3140,391 3140,312 3139,86 3139,77 3139,58 3139,58 3139,34 3139,257 3139,015 3138,44 3137,92 3137,852 3137,629 3136,481 3136,43 3136,20 3136,481 3136,43 3135,82 3135,82 3135,82 3135,483 3135,364 3135,364 3135,364 3135,369 3134,82 3134,82 3134,82 3134,82 3134,82 3134,82 3134,82 3134,32 3134,1115 3132,86 3132,86 3132,87 3132,86 3132,87 3132,87 3132,87 3132,87 3132,87 3132,87 3132,87 3132,87 3132,87 3132,87 3132,86 3132,84 3132,707 3132,31 3132,22 3131,33 3131,04 3130,804 3130,804 3130,804 3130,804 3130,804 3130,40 3130,40 3130,40 3129,44 3129,368 3129,3349 3129,1 3129,707 3128,640 3128,640 3128,640 3128,640	Fe I Cu I Ti I Kr II O II Kr II Kr III CI III Ar II Ar II O II Cu I Ar II Fe III Kr III Ca I Si III Al II Fe II Kr III Ti I Ar I Fe I Ar I O II Cs O II Ar I Fe I Ar I Ti I Ti I Ar I Cu I Ar I Fe I Ar I Cu I Ar I Ti	5 400 10 4 4 20 15 8 4 12 8 13 5 3 3 10 10 1 3 5 1 5 9 8 8 8 3 10 4 3 6 6 6 5 1 5 6 6 6 7 6 6 7 6 7 6 8 8 8 6 7 6 7 6 8 7 6 8 8 8 8	3126,380 3126,267 3126,1986 3126,109 3126,02 3125,98 3125,96 3125,73 3125,654 3125,59 3125,44 3125,3 3125,45 3124,762 3124,61 3124,414 3124,39 3124,28 3124,28 3124,19 3124,18 3124,19 3124,18 3124,19 3124,18 3124,19 3122,68 3124,02 3124,02 3124,02 3124,02 3124,02 3124,19 3124,18 3124,18 3124,18 3124,18 3124,18 3124,18 3124,18 3124,19 3121,515 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,66 3122,086 3122,66 3122,66 3122,086 3122,086 3122,065 3121,515 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,435 3120,436 3119,800 3119,725 3119,800 3119,725 3119,866 3118,85 3118,79 3118,69	Mg I Si III Ne I Fe I Cu I Kr II Ar IV Cl II Fe I Fe II Fe II Fe II Fe III Na II Kr III Cl II Ar II F III Cl II Cl II Ti I T	2 6 200 8 1400 6 - 5 1 15 0,5 6 4 1 1 8 1 3 100 6 1 2 3 2 2 12 20 1 1 15 15 6 20 12 250 5 10 12 20 30 6 50 3 1 3 12 15 15 8 6 2 1 0,5
3128,40 3127,90 3127,90 3127,883 3127,684 3127,41	Xe II Ar III Ti I Ti II Ti I N IV	1 7 5 10 8 2	3118,355 3118,35 3118,130 3118,02 3117,899 3117,85	Cu I Cs Ti I Ne II Ti I Ar I	5 4 15 4 5 3
3126,40	NII	3	3117,75	F II	0

λ	Symbol	I	λ	Symbol	I
3117 ,669 3117 ,656	Ti II Ca I	$\frac{20}{1}$	3104 ,396 3104 ,359	Na II Ar II	4 5
3117 ,455 3116 ,78	Ti I Xe II	$rac{6}{2}$	3103,804	Ti II	50
3116,6337	Fe I	12	3103 ,47 3102 ,975	Xe III Ti II	3 2
3116 ,63 3116 ,590	Ar I Fe II	3 6	3102,953 3102,73	Ar II Xe II	1 3
3116 ,348 3116 ,22	Cu I Ar I	400 1	3102,585	Ar II	4
3115 ,73 3115 ,669	O III F III	$\frac{\tilde{4}}{10}$	3102,517 3102,36	Ti I Ca I	$\frac{3}{0}$
3114,96	Ar I	1	3102,043 3101,790	K I K I	3 4
3114 ,46 3114 ,378	Xe III Ar II	$\frac{12}{3}$	3101,526	Ti I	4
3114,293	Fe II	7	3101,51 3101,407	Xe II Ne	$\frac{50}{2}$
3114,10 3114,092	Ar I Ti I	$\frac{1}{20}$	3101 ,004 3100 ,6667	Ar II Fe I	$\frac{2}{20}$
3113 ,92 3113 ,71	Kr II O II	$\frac{2}{1}$	3100,666	Ti I	12
3113,579 3113,482	F III Cu I	8 50	3100 ,570 3100 ,3054	C II Fe I	$\frac{2}{20}$
3112 ,74 3112 ,482	Xe II Ti I	$\frac{20}{8}$	3100,09 3099,9695	Ar I Fe I	5 15
3112,25	Kr III	60	3099,928	Cu I	1250
3112,18 3112,050	Cs Ti II	$\frac{4}{10}$	3099,923 3099,91	Ar II Xe III	5 8
3111,609 3111,45	Fe III Kr II	$\frac{8}{2}$	3099,8968	Fe I	20 1
3111,283	Ti I	10	3098 ,50 3098 ,21	Xe II Xe II	2
3110 ,841 3110 ,66	Fe III Ar I	$\frac{8}{3}$	3098 ,192 3097 ,52	Fe I O II	$\begin{array}{c} 6 \\ 0 \end{array}$
3110,620	Ti II Ar III	$\frac{20}{7}$	3097,38 3097,186	Cs Ti II	$\begin{array}{c} 10 \\ 25 \end{array}$
$3110,41 \\ 3110,095$	Ti II	8	3097,16	Kr III	40
3109 ,711 3109 ,581	Ar II Ti I	4 8	3097 ,15 3096 ,90	Ne II Xe II	$\frac{3}{8}$
3109 , 3 3108 ,801	Cs Ar II	$\frac{4}{2}$	3096 ,890 3096 ,826	Mg I Si III	$\frac{24}{16}$
3108,605	Cu I Ca I	2000 3	3096,72	Cl II	25
3108,58 3108,452	Cu I	600	3096,52 3096,424	Kr II Ti II	$\frac{20}{2}$
3107 ,978 3107 ,82	Fe III Xe II	$\frac{6}{20}$	3096,296	Fe II Cs II	$\frac{\overline{5}}{6}$
3107,468	Ti I Ca I	$\frac{12}{1}$	3095 ,86 3095 ,81	O III	00
3107 ,388 3106 ,806	${ m Ti}{ m I}$	8	3095,14	Kr II	30
3106 ,33 3106 ,234	Xe III Ti II	30 35	3094,960 3094,82	Ar II Cs	4 4 20
3106,16 3106,09	F II Cl IV	4 1	3094 ,53 3094 ,08	Xe II Ne II	30 4
3105,68	Kr II Fe II	1 5	3093,989 3093,813	Cu I Ti I	$\frac{1500}{3}$
3105 ,548 3105 ,168	Fe II	5	3093 ,65 3093 ,424	Si III Si III	$\frac{5}{20}$
3105,084	Ti II	$\frac{20}{6}$	3093,403 3092,984	Ar II Mg I	$\begin{array}{c} 10 \\ 22 \end{array}$
3105,00 3104,809	K II Mg II	8	3092,964	Ar I	1
3104,722	Mg II	9	3092,91	Ne II Cl II	2
3104,593 3104,46	Ti II Cl III	3 6	3092,90 3092,8386	Al I	20
3104,40	Xe II	70	3092,729	Na II	10

λ	Symbol		λ	Symbol	I
				3,111001	
3092,7099 3092,41	Al I Xe II	26 15	3081 ,222 3080 ,874	N II Cs II	$\frac{2}{6}$
3092,31	Cs II	10	3080,826	Ca I	2
3092,22 3091 , 6	Cl II Cs	$\frac{50}{4}$	3080,250	Na II	3
3091,5786	Fe I	$2\overline{0}$	3979 ,175 3078 ,875	Ne I Ne I	100 100
3091,32	Ar I	2	3078 ,733	Na II	1
$3091,065 \\ 3091,06$	Mg I Xe III	20 50	3078,698 3078,645	Fe II Ti II	8 50
3090,47	Xe II	1	3078 ,315	Na II	6
3090 ,18 3090 ,137	Ar I Ti I	1 8	3078,25 3078,15	N IV Ar III	6 10
3090,051	Ti II	8	3078,07	Cs II	6
3089 ,401 3089 ,17	Ti II Ar I	$\frac{15}{2}$	3078 ,018 3077 ,523	Fe I Si III	4 4
3089,053	Cs II	5	3077,40	Ar IV	8
3088,92 3088,910	Xe II Ar II	$\frac{3}{3}$	3077,168 $3076,971$	Fe II Ne I	$\begin{array}{c} 10 \\ 200 \end{array}$
3088.9	Cs	4	3076,68	Cl IV	6
3088,523 3088,23	Al II Ne II	$\frac{3}{3}$	$3076,455 \\ 3075,95$	Fe II O III	6_0
3088,209	Ar II	7	3075,7214	Fe I	25
3088,132	Cu I	125	$\begin{bmatrix} 3075, 225 \\ 3075, 19 \end{bmatrix}$	Ti II O III	$\frac{40}{0}$
3088 ,04 3088 ,027	O III Ti II	$\frac{2}{75}$	3075,00	ΚII	3
3087,90 3087,81	CII	0	$3074,68 \ 3074,665$	O III Al II	00 6
3087,34	Ar I Xe II	1 1	3074 ,334	Na II	6
3087 ,31 3087 ,047	Ar I Na II	$\frac{1}{2}$	3074,15	Ar I	1
3086,903	CII	1	3074 ,15 3073 ,99	O III Mg	0 8
3086,78	NII	2	3073,798	Cu I	1400
3086 ,47 3086 ,47	Ar I Cu I	$\frac{2}{2}$	3073 ,49 3073 ,17	Xe III Xe II	$\frac{10}{2}$
3086,46	Si III	6	$3072,971 \ 3072,7$	Ti II	$\begin{array}{c} 40 \\ 4 \end{array}$
3086, 236 3085, 026	Si III Ar II	$\begin{array}{c} 25 \\ 5 \end{array}$	3072,68	Cs Ne II	1
3084,96 3084,875	Cu I Cs II	$\frac{2}{5}$	3072,107 3071,96	Ti II Cu I	$\frac{30}{2}$
3084,819	Ti I	4	3071,66	O IV	5
3084,63 3084,155	O III N II	$\frac{0}{2}$	3071,39	Xe II	6
3084,07	Fe III	6	3071 ,36 3071 ,35	Cl IV Cl II	$\frac{3}{40}$
3083,7430	Fe I	20	3071,242	Ti II	15
3083 ,65 3083 ,64	O III Ar III	$\frac{1}{3}$	3071 ,08 3070 ,97	Ne II Cu I	$\frac{2}{5}$
3083,54	Xe III	40	3070,84	Na II	0
3083,363	Si III	2	3069,73 3069,66	Cs Cl II	$\frac{4}{5}$
3083 ,193 3083 ,052	Ar II C II	$\frac{1}{2}$	3068,906	Cu I	15
3082 ,979 3082 ,87	Ar II	5	3068,68	O III	0
	Xe II	2	3068 ,238 3068 ,1749	Si III Fe I	7 8
3082 ,62 3082 ,381	Xe II C II	$\frac{20}{2}$	3068 ,06 3068	O III O VI	00
3082 ,191	N 11	4	3067,8	Cs	$\frac{\overline{4}}{4}$
3082 ,1529 3081 ,575	Al I Ti II	24 5	3067,30 3067,2457	Xe II Fe I	$\frac{30}{30}$
3081 ,485	N II	$\frac{\circ}{2}$	3067,214	Ne	4
3081,46	O II	$\frac{2}{1}$	3067,8 3067,1196	Cs Fe I	4 8
3081 ,45	Ne	1 4	3066 ,889	Ar II	6

3066,72			i -	1		
3066,71 F III 2 3058,00 C I II 40 3066,60 C S II 10 3066,60 Xe II 1 4 3057,345 Ti II 10 3066,536 Na II 4 3057,385 Ti II 10 3066,536 Na II 4 3057,385 Ti II 10 3066,536 Na II 4 3057,385 Ti II 10 3066,238 Na II 4 3057,385 Ti II 14 3066,220 Ti II 30 3057,444 Al 1 144 3066,220 Ti II 30 3057,444 Al 1 144 3066,011 Cu I 3 3056,83 C II 1 3066,011 Cu I 3 3056,83 C II 1 3065,668 Ne 1,5 3056,73 Ar I 1 3006,802 Fe II 5 3065,688 Ne 1,5 3065,72 Kr III 30 3065,120 Ar II 3 3056,40 Xe II 20 3065,11 Ar IV — 3056,49 Xe II 20 3064,477 Ar III 10 3056,04 Cs 6 3064,372 Na II 4 3056,04 Cs 6 3064,372 Na II 4 3056,04 Cs 6 3063,57 Kr II 30 3063,69 Ne I 200 3056,148 Kr II 30 3063,57 Kr II 30 3063,49 Ne I 200 3055,218 Fe I 12 3063,40 Xe II 12 3063,40 Xe II 12 3063,40 Xe II 12 3063,40 Xe II 14 3063,57 Kr II 30 3063,48 Ar I 1 12 3063,49 Xe II 12 3063,40 Xe II 12 3063,40 Xe II 12 3063,40 Xe II 12 3063,57 Kr II 3 3054,69 Ne II 12 3063,40 Xe II 12 3063,40 Xe II 14 3063,57 Kr II 3 3054,69 Ne II 15 3063,40 Xe II 15 3063,57 Kr II 3 3054,69 Ne II 15 3063,40 Xe II 15 3063,57 Kr II 3 3054,69 Ne II 15 3063,40 Xe II 15 3063,57 Kr II 3 3054,69 Ne II 15 3063,40 Xe III 15 3063,41 Xe III 16 3062,43 Kr III 3 3054,49 Xe III 15 3063,40 Xe III 15 3063,41 Xe II 16 3062,43 Kr III 3 3053,48 Si II 16 3062,43 Kr III 3 3053,48 Si II 15 3063,40 Xe II 15 3063,40 Xe II 15 3064,51 Kr II 6 3062,58 Ne II 12 3053,40 Xe II 14 3053,40 Xe III 15 3064,51 Kr II 6 3066,64 Kr II 12 3056,07 Kr II 13 3056,08 Xe II 14 3056,09 Ar II 8 3050,07 Fe I 5 3056,00 Xe II 14 3059,00 Xe II 16 3059,00 Xe II	λ	Symbol	I	λ	Symbol	I
3058,727 Na II 1 3048,80 F III 2 3058,68 O V 0 3048,784 Ar II 2	3066,71 3066,60 3066,536 3066,514 3066,534 3066,238 3066,220 3066,145 3066,011 3065,73 3065,668 3065,315 3065,120 3065,11 3065,120 3064,77 3064,372 3064,290 3063,7 3063,695 3063,57 3063,502 3063,46 3063,41	FIII Cs II Xe II Xe II Xe II Na II Ti II Ti II Ti II Al I Cu I Ar II Ar II Ar III O III Ar II Cs Ne I Kr III Co II Ar I Cs Ar II Co II III Co II Co III Co I	$\begin{array}{c} 2\\ 10\\ 1\\ 4\\ 3\\ 20\\ 1\\ 30\\ 5\\ 3\\ 1\\ 1\\ 6\\ 3\\ 200\\ 3\\ 4\\ 6\\ 5\\ 200\\ 3\\ 4\\ 6\\ 5\\ 200\\ 3\\ 4\\ 6\\ 5\\ 200\\ 3\\ 4\\ 6\\ 5\\ 200\\ 3\\ 4\\ 6\\ 5\\ 2\\ 30\\ 1\\ 1\\ 6\\ 8\\ 4\\ 0\\ 6\\ 6\\ 6\\ 3\\ 3\\ 100\\ \end{array}$	3058,00 3057,4471 3057,395 3057,388 3057,36 3057,36 3057,444 3057,083 3056,85 3056,84 3056,802 3056,740 3056,72 3056,49 3056,28 3056,157 3056,04 3055,346 3055,31 3055,2638 3054,82 3054,69 3054,69 3054,69 3054,49 3054,49 3054,49 3054,138 3053,74 3053,664 3053,5 3053,38 3053,184 3053,151 3053,37 3053,664 3053,5 3053,38 3053,184 3053,151 3053,070 3052,554 3052,54 3052,57 3050,98 3050,98 3050,98 3050,97 3050,91 3050,073 3050,073 3050,073 3050,073 3050,073 3050,073 3050,073 3050,073 3049,671 3049,398	CI II Fe I Ti II Ne I Cu I Al I F II C II K III Fe II K III K II K III C II C	40 40 10 300 8 14 6 1 5 15 30 20 3 6 6 30 1 31 21 22 5 4 4 6 1 1 1 1 1 1 1 1 1 1 1 1 1
3058,6 Cs 6 3048,766 Ti II 6 3058,45 C II 2 3048,69 C II 0 3048,50 Xe II 2	3058 ,727 3058 ,68 3058 ,6 3058 ,45	Na II O V Cs C II	$\begin{matrix} 0 \\ 6 \\ 2 \end{matrix}$	3048,784 3048,766 3048,69	Ar II Ti II C II	$egin{matrix} 2 \\ 6 \\ 0 \end{matrix}$

λ	Symbol	I	λ	Symbol	I
3048,30 3048,47 3048,021 3047,9 3047,76 3047,57 3047,16 3047,13 3047,077 3046,93 3046,685 3046,284 3046,27 3046,079 3045,949 3045,9 3045,593 3045,593 3045,58 3045,58 3045,58 3045,085 3045,076 3045,000 3044,843	Si II Xe II Ar II O II Xe II Fe I Ne II K II O III F III F III Kr III Ti II Si III Xe II Ar II Ne I Cs Si II Na II Ne II Xe II Ti II Fe I Si III Fe I Si III Fe I	50 5 2 0 8 100 6 2 8 4 50 30 3 25 5 7 4 10 5 4 30 5 5 5 10 5 5 5 5 5 5 5 5 5 5 5 5 5	3039,31 3039,254 3039,21 3038,91 3038,706 3038,38 3037,98 3037,73 3037,3901 3037,35 3037,287 3037,071 3036,986 3036,96 3036,887 3036,80 3036,4101 3035,98 3035,43 3034,761 3034,761 3034,761 3034,755 3034,54 3034,54 3034,48	Cs F III Si II C III Ti II Kr II Ar IV Cl II Ne II Fe I Xe II Si III Na II Fe II Ar III Ar III Ar III Kr II Cu I Ne II Cu I Ne II Cu I K I K I K I K I K I K I K I K I K I K	1 4 7 3 1 6 3 6 35 4 80 6 8 5 5 3 2 30 2500 3 4 — 6 3 1,5 5
3044,80 3044,75 3044,16 3044,028 3043,932 3043,851 3043,692 3043,02 3043,02 3042,808 3042,6667 3042,535 3042,463 3042,3 3042,191	Kr III Xe II Ne II Cu I Si III Ti II Si II Ne O III F III Fe I Ti I Ar II Cs Si II	6 10 2 20 7 5 10 100 2 5 10 15 3 1	3034,48 3034,32 3034,46 3033,71 3033,510 3033,480 3033,41 3032,77 3032,66 3032,50 3032,41 3032,08 3031,639 3031,59 3031,59 3031,5	Ne II O III Kr II Xe II Ar II Cu I Xe II Kr II Si III O II Cs O II Fe I Kr II Cs Fe I	5 0 2 10 10 2 6 5 4 1 4 2 15 5 4 12
3042,12 3042,0215 3041,7401 3041,6396 3041,573 3041,278 3040,933 3040,512 3040,4281 3039,76 3039,75 3039,746 3039,714 3039,65 3039,488 3039,51	Xe II Fe I Fe I Si II Al II Si III C II Fe I O II Ar IV F III C II Ne II Cu I O II	12 15 15 10 20 6 9 2 15 4 -6 3	3030,792 3030,43 3030,35 3030,313 3030,258 3030,1494 3030,01 3030,000 3029,730 3029,60 3029,15 3029,1 3029,068 3028,914 3028,860 3028,82	Ne II K II Cs Ne I Cu I Fe I Kr II Si II Ti II Cu I Cs Li II Na II Ar II Ne II O II	2 2 4 50 10 15 4 100 35 2 4 2,5 6 8 4

λ	Symbol	I	a a	Symbol	1
3028 ,721 3028 ,66 3028 ,424 3028 ,25 3028 ,04 3027 ,82 3027 ,63 3027 ,27 3027 ,16 3027 ,011 3026 ,762 3026 ,745 3026 ,52 3026 ,4637 3025 ,75 3025 ,638 3024 ,994 3024 ,63 3024 ,57 3024 ,45 3024 ,36 3024 ,074 3024 ,05 3024 ,0337 3023 ,86 3023 ,83 3023 ,86 3023 ,85 3022 ,93 3022 ,608 3022 ,49 3022 ,608 3021 ,55 3021 ,0743 3020 ,6405 3020 ,4918 3020 ,37	Ar II Ca III Ne Cs O IV Cu I Xe II Xe II Ar III Ne II Fe III Fe II Fe I Cu I Ne O III Fe I Cu I Ne O III Ar III Fe I II I	3 6 1 4 0 5 2 3 5 4 6 3 1,5 8 15 50 1 15 100 2 4 80 1 1 12 15 12 8 100 4 5 30 15 30 15 30 15 30 15 30 4 4 4 4 5 5 6 6 7 8 7 8 8 8 8 7 8 8 8 8 8 8 8 8 8 8	3017,348 3017,348 3017,348 3017,187 3016,185 3016,15 3016,14 3015,980 3015,8 3015,52 3015,400 3015,260 3014,920 3014,481 3014,481 3014,481 3013,82 3013,510 3013,37 3013,167 3013,091 3012,955 3012,88 3012,83 3012,129 3012,041 3012,005 3012,005 3014,482 3010,838 3012,005 3012,000 3011,482 3010,838 3010,02 3009,83 3009,62 3009,5707 3009,205 3009,138 3008,42 3008,322 3008,42 3008,42 3008,12 3008,12 3008,12 3008,12 3008,12 3008,12	Ne I Ne II Ti II Fe I Ar IV O II Si II Cs Xe II Na II Fe III Si II Cu I O II Ar II Xe III Ne I Cu I O II Fe III Si III O II Fe III Si III O II Fe I Cu I O II Fe I Cu I Cu I O II Fe I Cu	50 3 50 12 5 1 3 4 20 6 7 3 30 1 6 6 2 2 3 20 5 50 1 1 50 8 250 1 7 200 1 1 500 1 1 1 2 2 3 2 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
3020 ,29 3020 ,0044 3020 ,001 3019 ,78 3018 ,9848	Xe II Si I Fe II Xe II Fe I	2 75 10 2 15	3007,793 3007,74 3007,442 3007,275 3007,4469	Fe III O II Na II Fe III Fe I	6 3 4 20 8
3018 ,82 3018 ,789 3018 ,30 3018 ,09 3017 ,65	Cl II Fe III Kr II Cu I Kr II	12 6 1 2 20	3007,1469 3007,08 3006,98 3006,97 3006,858	O II Cl II Xe II Ca I N II	3 20 2 6 7
3017,63 3017,6288 3017,43	O III Fe I Xe II	5 15 100	3006 ,830 3006 ,82 3006 ,75 3006 ,7387	O II Cs II Si I	3 50

λ	Symbol	I	λ	Symbol	I
3006,05 3006,01 3005,62 3004,486 3004,39 3004,35 3004,35 3003,98 3003,15 3003,0323 3002,961 3002,93 3002,88 3002,730 3002,649 3002,48 3002,24 3001,920 3001,85 3001,617 3001,663 3001,617 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3001,21 3000,9489 3000,892 3000,863 3000,4527 3000,442 3000,110 3000,097 3000,059 2999,84 2999,641 2999,513 2999,5125 2999,465	Cl II O II O II O II O II Ar II Cl II O III Xe III F III F III F III Cs Ti I Fe II Kr III Cu I Kr III Cu I Kr III Fe III Cu I Fe III Ca I Fe II Ca I Cs Fe II Ca I Cs Fi III Ca I Cs	$\begin{array}{c} 20 \\ 2 \\ 2 \\ 2 \\ 10 \\ 430 \\ 40 \\ 20 \\ 10 \\ 61 \\ 63 \\ 13 \\ 25 \\ 100 \\ 63 \\ 100 \\ 20 \\ 5 \\ 100 \\ 20 \\ 5 \\ 150 \\ 20 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 2 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 20 \\ 3 \\ 3 \\ 40 \\ 40 \\ 40 \\ 40 \\ 40 \\ 40 $	2995,94 2995,75 2995,524 2995,34 2994,958 2994,69 2994,4281 2994,385 2994,250 2994,250 2994,13 2993,09 2992,91 2992,618 2992,420 2992,24 2992,24 2992,22 2992,118 2991,780 2991,780 2991,780 2991,780 2991,780 2991,780 2991,780 2991,780 2991,85 2990,881 2990,85 2990,881 2990,85 2990,881 2990,54 2990,85 2990,881 2990,54 2990,3933 2990,17 2990,036 2989,010 2988,69 2988,61 2988,45	O II Ti II Al II Cs Ca I Xe III Fe I Fe I Al II Full Ne I Cu I Kr III Cl II Kr III Kr III Kr III Cu I Xe III Ti I Cu I Xe III Ti I	1 5 1,5 20 5 8 100 5 1 8 35 2 8 40 8 200 200 6 1 600 1 2 3 15 3 5 8 100 3 2 2 12 3 6 10 3 6 2 3 7 4 3 150 10 10 13 3 4 2
		"	,	• •	

λ	Symbol	I	λ	Symbol	I
2984,830 2984,785 2984,76 2984,63 2984,479	Fe II Fe I Ti III Xe III F III	15 10 10 15 5	2976 ,971 2976 ,81 2976 ,39 2976 ,28	N II Cs Xe II Kr II	4 2 8 3
2984 ,267 2984 ,183 2983 ,94 2983 ,91	Cu I Na II Kr II Cs	5 7 2 2 5	2976 ,131 2975 ,938 2975 ,92 2975 ,65 2975 ,518	Fe I Fe II Kr II Cs Ne I	3 5 5 3 2 2 35
2983,82 2983,78 2983,765 2983,66 2983,58 2983,5714 2983,290 2983,22 2983,038 2982,78 2982,765	Ne O III F III O III N III Fe I Ti I Kr IV Cu I Cl II	9 4 1 6 125 20 2 3 18	2975,13 2974,991 2974,926 2974,86 2974,714 2974,675 2974,65 2974,527 2974,52 2974,236 2974,04	Cs Na II Ti I Xe II Ne I Cu I N II Ne N V Na II Kr II	2 6 4 20 300 10 2 1 6 2 25
2982,663 2982,5 2982,34 2982,23 2982,123 2982,106 2982,07 2982,062 2982,03	Ne I Cs Kr II Xe II Cu I C III N III Fe II Cs	300 2 1 2 3 8 1 8	2973,601 2973,46 2973,2368 2973,1336 2973,07 2972,8 2972,63 2972,60 2972,34	N II Cl II Fe I Fe I Ne II Cs Cl II N III	3 2 60 60 1 2 5 4
2981,854 2981,4459 2981,31 2980,922 2980,90 2980,78 2980,642	Fe I Fe I N V Ne I Cl II N V Ne I	6 20 10 50 4 8 40	2972,31 2972,279 2971,80 2971,839 2971,522	Xe II Fe I Kr II Mg II Si IV	8 3 4 1 1 8
2980 ,622 2980 ,538 2980 ,519 2980 ,47 2979 ,81	Na II Fe I Si III Cl II Kr II	3 5 5 2 20	2971 ,24 2970 ,851 2970 ,725 2970 ,682 2970 ,67	Xe III Cs II Na II Fe II Cl III	5 1 5 4
2979 ,806 2979 ,662 2979 ,380 2979 ,352	Ne I Na II Cu I Fe II	50 5 25 8	2970 ,554 2970 ,513 2970 ,372 2970 ,3547	Ti I Fe II Ti I Si I	4 5 10 55 40
2979,32 2979,20 2979,051 2979,050 2978,87 2978,87	Xe II Ti II Ar II Na II Kr II N III	$ \begin{array}{r} 300 \\ 10 \\ 15 \\ 2 \\ 25 \\ \hline 3 \\ \end{array} $	2970, 106 2969, 934 2969, 80 2969, 59 2969, 4759	Fe I Fe II Xe II C II Fe I Xe III	8 12 0 10
2978,48 2978,295 2978,145 2977,90 2977,80	Cl II Cu I F III Xe II Ti II	7 30 4 5 7	2969 ,45 2969 ,3606 2969 ,23 2969 ,145 2969 ,0	Fe I Xe II Mg II Cs	5 3 0 8
2977,32 2977,258 2977,222 2977,132	N III Cs II Fe III Na II	3 3 6 3	2968 ,836 2968 ,56 2968 ,383 2968 ,31 2968 ,226	C II Xe III Cs II Kr III Ti I	10 5 20 4

		•			
 λ	Symbol	I	λ	Symbol	I
2968,020 2967,87 2967,868 2967,629 2967,25 2967,218 2967,218 2967,181 2966,97 2966,899 2966,871 2966,74 2966,74 2966,74 2966,750 2965,750 2965,681 2965,56 2965,681 2965,56 2965,4 2965,56 2965,4 2965,231 2965,11 2965,037 2965,037 2964,846 2964,629 2964,21	Mg II Mg II C II C II Kr II C I Ti I Ne II Xe III Fe I F III C II Kr II Na II Ti I Ti I Ti I CI III Cs Fe I Ti I Kr II Kr II Fe II Kr II Fe II Kr II Fe II Cs II Kr II Cs Fe I Ti I Cl III Cs Fe I Ti I Cs I Ti I Ti I Cs I Ti	2 1 7 3 80 5 25 3 10 125 1 5 1 3 3 3 2 15 8 6 2 20 6 0 2 10 8 15 2 10 2 10 10 10 10 10 10 10 10 10 10 10 10 10	2958,35 2958,30 2958,286 2957,532 2957,50 2957,3660 2957,293 2956,795 2956,541 2956,541 2956,18 2955,84 2955,84 2955,388 2955,20 2955,13 2954,76 2954,76 2954,76 2954,37 2954,37 2954,28 2953,95 2953,95 2953,95 2953,40 2953,40 2952,7 2952,56 2952,527 2952,48	Kr II Ti II Fe III Ar II Ti IV Fe I Ne I Ti I Ar II Kr II Ti I Xe II Kr III F III Kr III F III F III F III C IV Fe I Fe I C IV Ne II Li II Kr III	20 2 6 3 4 30 8 25 4 3 70 2 7 10 3 2 2 60 5 0,5 12 1 50 11 50 0 0 0 0 5 5 6 6 6 6 6 7 7 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9
2964,21 2964,19 2964,131 2963,41 2963,235 2963,230 2962,953 2962,8 2962,4 2961,596 2961,272 2961,165 2961,06 2961,05 2960,78 2960,260 2960,14 2960,112 2959,9929 2959,98 2959,74 2959,682	Cl II Xe II Fe II Xe II Ne II Fe III N II Cs Cs F III Fe II Cu I Al III Kr II Kr II Kr II Ti I Ti I Fe I	2 12 7 50 2 8 4 2 2 5 5 2500 1,5 4 5 40 10 5 5 3 5	2952,527	Ne I	
 2959,67 2959,666 2959,599 2959,450 2958,98	Si III F III Fe II Si III Ti II	3 2 7 5 50	2948,388 2948,38 2948,13 2948,06 2947,8773	Fe III Ti I Kr III Xe III Fe I	8 60 10 40 60

λ	Symbol	I	λ	Symbol	I
2947,85 2947,700 2947,658 2947,53 2947,441	Cs Ti I Fe II Xe III Na II	2 3 13 40 5	2935 ,30 2935 ,23 2935 ,42 2934 ,80	Ne II Kr III C IV Xe II	1 20 1 2 5
2947 ,297 2947 ,275 2946 ,732 2945 ,695	Ne I Ar II Ne I Na II	200 2 2 4	2934,60 2934,065 2934,00 2933,70 2933,526	Cl II Na II Kr III Ne II Ti I	5 2 10 2 25
2945 ,47 2945 ,368 2945 ,25 2945 ,23 2945 ,106	Ti II Cu II Xe III Cu I He I	50 2 60 3 100	2933,34 2933,060 2932,74 2932,721	Xe II Cu I Xe III Ne I	1 20 25 100
2944 ,61 2944 ,575 2944 ,398 2944 ,1	Xe II Ne I Fe II Cs	$\begin{array}{c} 4\\2\\13\\2\end{array}$	2932 ,589 2932 ,479 2932 ,06 2931 ,699 2931 ,483	Ar II F III Kr II Cu I	8 8 1 10 9
2943 ,495 2943 ,41 2943 ,12 2942 ,892	N II Xe II Ti II Ar II	4 4 12 20	2931 ,483 2931 ,27 2931 ,09 2930 ,883 2930 ,416	Ar II Ti II Cs II Na II Cu I	40 20 1 5
2942 ,25 2942 ,17 2942 ,10 2941 ,993	Cs II N II Xe II Ti II Ti I	8 3 20 50 60	2930 ,40 2930 ,29 2930 ,14 2929 ,312	Kr II Xe III Ti IV Ne I	2 20 1 15
2941 ,963 2941 ,995 2941 ,893 2941 ,39 2941 ,38	Mg I Ar II Ti II Xe II	13 1 8 8	2929 ,121 2929 ,0085 2928 ,69 2928 ,655	Fe I Fe I T1 II N II	6 25 15 3 9
2841 ,3438 2940 ,953 2940 ,22 2939 ,91	Fe I Cs II Xe III Kr III	15 20 40 15	2928,634 2928,313 2927,87 2927,58	Mg II Ti I Ti II Xe II Ti II	30 2 2 10
2939 ,72 2939 ,70 2939 ,55 2939 ,506 2939 ,453	Xe II Kr II Fe III Fe II Cu I	5 2 7 5 2	2926 ,75 2926 ,587 2926 ,33 2926 ,33	Fe II Ar IV O III Cs II	10 12 11 2 1
2939 ,13 2938 ,868 2938 ,69 2938 ,56	Xe III Cu I Ti II Kr III	10 15 30 4	2926 ,274 2926 ,14 2926 ,057 2925 ,623	O IV Cu I Ne II Cu I	1 10 3 30
2938 ,5 2938 ,473 2938 ,45 2937 ,811	Cs Mg I K III Fe I	20 12 5 10	2925,439 2924,882 2924,642 2924,52 2924,48	Cu I Cu I Ar II Al II Cs	10 10 3 2
2937,766 2937,725 2937,52 2937,293	Cu I Na II Ti IV Ti I	2 5 5 25	2924 ,38 2924 ,33 2923 ,95 2923 ,902	Xe II Ca III Xe II Fe III	2 8 6 8
2936,9049 2936,739 2936,509 2936,47	Fe I Mg I Mg II Ti II	60 10 10 30	2923 ,852 2923 ,704 2923 ,51 2923 ,474	Fe I Cu I Xe III Na II	7 80 25 3
2935 ,86 2935 ,538	Xe II Ar II	60 3	2923 ,212 2923 ,050	Cu I N II	20 1

λ	Symbol	I	λ	Symbol	I
2923,03 2922,830 2922,76 2922,21 2922,024	Xe II Cu I N II Cs Fe II	1 10 1 2 5	2910 ,729 2910 ,64 2910 ,82 2910 ,44 2910 ,27	C II Xe II Cs Ne Xe II	3 1 2 2 3 5
2921 ,92 2921 ,83 2921 ,43 2921 ,03 2920 ,940	Kr II Cs O IV Cs Na II	4 2 3 20 4	2910,059 2909,912 2909,77 2909,17	Ne II Ti II Al III Kr III	$7\\2\\30$
2920 ,887 2920 ,6915 2920 ,538 2920 ,296	F III Fe I F III Cu I	4 5 6 10	2908,957 2908,74 2908,62 2908,14 2907,90	C II O II Kr II Ti II Ca III	2 1 5 4 2
2919 ,87 2919 ,845 2919 ,048 2918 ,77 2918 ,28	Xe II Na II Na II Ti II Ar IV	$egin{array}{c} 40 \\ 2 \\ 5 \\ 2 \\ 3 \end{array}$	2907,701 2907,520 2907,497 2907,18	Fe III Fe I Fe III Xe II	12 5 10 80
2918,023 2917,734 2917,67 2917,59	Fe I N II Kr III Xe III	10 1 10 20 5	2907,15 2907,09 2907,05 2906,815 2906,69	Kr II C II Al III Ne II Ti II	1 1 10 3
2917,516 2916,40 2916,335 2916,29 2916,16	Na II O III F III O IV Ne II	4 10 2 1	2906,62 2906,56 2906,360 2906,34	O II Xe III Mg I Al III	3 50 4 3
2916 ,09 2915 ,967 2915 ,78 2915 ,65 2915 ,593	Ti II Ar II Kr III O II Ar II	10 1 6 1 4	2906 ,29 2906 ,25 2906 ,17 2906 ,011 2905 ,85	C IV Cl II Cs C II Ne	$\begin{array}{c} 5 \\ 20 \\ 2 \\ 2 \\ 4 \end{array}$
2915 ,453 2915 ,24 2914 ,932 2914 ,89	Mg I Cs Ar II Ti II	3 2 1 10	2905,80 2905,715 2905,692 2905,662	Fe III C II Si II Cu I	8 2 500 5
2914,652 2914,12 2913,417 2913,34 2913,279	Cs II Xe III Ne I Ti II F III	8 20 2 10 8	2905,655 2905,301 2905,10 2905,00 2904,914	Ti I F III Xe II O II Na II	5 6 2 2 7
2913 ,267 2913 ,23 2913 ,168 2913 ,08	Al I Kr II Ne I Ti II	3 4 200	2904 ,470 2904 ,431 2904 ,357	F II Si IV Fe III N II	0 2 12 1
2913,00 2912,98 2912,916 2912,1589	Ar IV O III Cu I Fe I	12 2 2 2 20	2904,29 2904,283 2904,18 2903,30	O II Si II Xe II O III	3 3 4
2912,082 2912,06 2911,90 2911,85 2911,47	Ti I Cl II Xe III O II Xe III	40 15 40 2 2	2903 ,19 2902 ,923 2902 ,68 2902 ,47	Al II Mg I Xe II Fe III	1 2 3 9
2911,461 2911,215 2911,20	Ne I Cu I O II	25 30 2	2902 ,456 2902 ,45 2902 ,258 2902 ,08	Fe II Cl II Al I Al II	5 4 2 2

λ	Symbol	I	λ	Symbol	I
2901 ,915 2901 ,60	Fe I C IV	5 2	2890 ,59 2889 ,447	Ti II F III	8 8
2901 ,3820 2901 ,136	Fe I Na II	2 5 4	2889 ,07 2888 ,923	Xe II Ti II	10 15
2901,1 2900,04	Cs Kr III	$\frac{2}{20}$	2888 ,62 2888 ,43	Ti II Ne II Fe II	10 1 5
2900 ,02 2899 ,78 2899 ,75	Ti IV Ca III Cs II	0 9 8	2888,093 2887,91	O II Fe I	3 5
2899,57 2899,086	Xe III N II	1 1	2887 ,807 2887 ,559 2887 ,511	F III Si II	8 10
2898 ,90 2898 ,48	K III O III	1 1	2887 ,456 2887 ,41	Ti II C III	2 4
2898 ,355 2897 ,69	Fe I Xe III	5 2	2887 ,358 2887 ,12	Si II Xe II	5 10
2897 ,503 2897 ,332 2897 ,262	N II Ar II Fe II	4 6 8	2886 ,67 2886 ,250	Cs Na II	20 4
2897,03 $2896,753$	Ne II Ar II	$\frac{2}{10}$	$egin{array}{llll} & 2885,\!928 \ & 2885,\!90 \ & 2885,\!496 \end{array}$	Fe II O II C II	5 1 6
2896,63 $2896,564$	Xe III Ar II	$\frac{30}{2}$	2885 ,408 2885 ,36	Cu I O III	5 3
2895 ,92 2895 ,92 2895 ,458	Kr III Kr II F III	1 1 4	2885 ,273 2884 ,808	N II C II	6 4
2895,45 2895,32	O III Cs	$\frac{2}{2}$	2884,77 2884,685 2884,55	N IV N II Kr III	4 2 2 8 4
2895 ,22 2895 ,215	Xe II Fe II	$\begin{array}{c} 150 \\ 7 \end{array}$	$2884,42 \\ 2884,246$	Cs N II	8 4
2895 ,131 2895 ,076	Si IV Fe III	3 8	2884 ,21 2884 ,20 2884 ,1955	Kr II Al II Cu II	2 4 60
2895,05 2895,036	Ne Fe I	$\begin{array}{c}1\\8\\2\end{array}$	2884,12	Ar III	9
2894 ,85 2894 ,778	Cs Fe II	7 2	2884 ,099 2884 ,01 2883 ,96	Ti II Cl II' O II	$\begin{array}{c} 70 \\ 2 \\ 4 \end{array}$
2894 ,63 2894 ,5055 2894 ,228	Kr II Fe I Al I	10 3	2883 ,78 2883 ,745	O I Cs II	3 5
2893 ,985 2893 ,946	Ar II Na II	1 6	2883 ,71 2883 ,702	Xe II Fe II	12 10
2893 ,889 2893 ,81	N II Cs	$\frac{1}{2}$	2882,99 2882,934	F IV Cu I Ne I	$1500 \\ 2$
2893 ,70 2893 ,63 2893 ,618	O III Kr III Na I	40 1	2881 ,852 2881 ,80	Ca III	7
2893 ,11	Ne	1 4	2881 ,70 2881 ,5792 2881 ,463	O III Si I Al II	$1000 \\ 4$
2892 ,868 2892 ,47 2892 ,18	N II O II Kr III	2 100	2881 ,28	O III Cs II	$\frac{2}{15}$
2891 ,88 2891 ,75	O II Cs	1 2	2881 ,19 2881 ,14 2881 ,140	Xe II Na II	$\frac{1}{6}$
2891 ,71 2891 ,64	Xe III Cu I	$\frac{25}{30}$	2880 ,756 2880 ,290	Fe II Ne I	$\frac{9}{3}$
2891 ,612 2891 ,36	Ar II Ne II	$^{18}_{0,5}$	2880 ,28 2879 ,80	Ti II O III	3
2891 ,050 2891 ,046	Ti II N II	15 3	2879 ,751 2879 ,743	N II Cu I Ar II	$\frac{4}{2}$
2890 ,84	Cu l	50	2879 ,327	AI II	- <u>+</u>

λ	Symbol	I	λ	Symbol	I
2879 ,25 2879 ,04 2878 ,95 2878 ,86 2878 ,72	Cs O II O I Cu I Ar III	8 3 2 5 5	2871 ,40 2871 ,399 2871 ,32 2871 ,270 2871 ,24	F II Ar II Cs Na II Xe II	5 1 2 5 50
2878 ,13 2877 ,6996 2877 ,681 2877 ,418 2877 ,3021	Ne II Cu II N II Ti II Fe I	0,5 40 4 60 8	2871 ,125 2871 ,059 2871 ,022 2870 ,61	Fe II Fe II Ar II Kr III Ti II	6 6 1 50 25
2877,29 2877,101 2876,802 2876,65 2876,49	Cs Cu I Fe II Ar III F III	8 5 7 1 3	2870,04 2869,993 2869,95 2869,95 2869,80	F III Ca III Ne II Cu I	$\begin{matrix} 3\\7\\2\\2\end{matrix}$
2876,49 2876,43 2876,42 2876,30 2876,025	F II Ne II Cl II O I Cu I	3 4 5 1 2	2869 ,3083 2869 ,283 2868 ,874 2868 ,732 2868 ,52	Fe I Ar II Fe II Ti II Al II	10 1 5 15 9
2875,88 2875,87 2875,79 2875,67	F II F III Ti II Cu I	2 3 10 10	2868 ,470 2868 ,42 2868 ,41 2868 ,33 2867 ,36	Cu I Xe III Cl II Cs Xe II	10 1 10 8
2875 ,39 2875 ,346 2875 ,3034 2875 ,30 2875 ,240	Ti II Fe II Fe I Cs Cu I	15 8 5 8 2	2867,30 2867,30 2866,90 2866,76	F III F II Cs Xe II	2 5 3 2 5
2875,09 2874,81 2874,80 2874,722 2874,626	Si III F III F II C III Si III	2 5 4 3 4	2866 ,73 2866 ,65 2866 ,6264 2866 ,57 2866 ,37	O III Ne Fe I Ca III	2 5 7 7
2874 ,583 2874 ,560 2874 ,43 2874 ,40	Ar II Cu I C III Ar IV	3 20 2 6	2865 ,841 2865 ,670 2865 ,45 2865 ,21	Cs II Ar II F III Cs Cl II	8 4 4 2 4
2874,24 2874,24 2874,22 2874,173 2874,08	Kr III C III F II Fe I Ti II	2 0 1 10 2	2864,973 2864,73 2863,8644 2863,86 2863,712	Fe II Xe II Fe I Xe III C III	5 150 8 1 4
2873 ,82 2873 ,72 2873 ,401 2873 ,13 2873 ,12	O III Kr II Fe II F II F III	2 4 10 2 4	2863,57 2863,55 2863,4311 2862,866 2862,67	O III Cl II Fe I F III Ti IV	3 7 8 6 1
2873,00 2872,95 2872,85 2872,73 2872,663	Ne II Na II Kr III Xe III Ne I	3 0 5 2 35	2862,52 2862,41 2862,40 2862,34	O III Xe III Cs Ti II	3 30 8 30
2872,382 2872,35 2872,3346 2871,68	Fe II Cs Fe I Xe III	9 8 7 30	2862 ,26 2862 ,26 2862 ,17 2862 ,07 2862 ,070	O III N III Kr II Cu I	3 6 2 5
2871 ,40 768	F III	8	2862,06	Ne I Cl II	8 5

λ	Symbol	I	λ	Symbol	I
2861,99 2861,40 2861,40 2861,38 2861,291 2861,060 2861,011 2860,85 2860,79 2860,742 2860,742 2860,308 2859,481 2859,32 2859,3 2859,16 2859,05 2858,8970 2858,734 2858,664 2858,399 2858,343 2858,322 2858,01 2858,00 2857,89 2857,81 2857,746 2857,771 2857,746 2857,771 2857,746 2857,771 2857,013 2856,928 2856,660 2856,660 2856,660 2856,660 2856,660 2856,660 2856,660 2856,616 2856,928 2856,441 2856,928 2856,441 2856,928 2856,441 2856,928 2856,444 2856,928 2856,444 2856,928 2856,444	Ti II Xe II F IV O III Ti II C II Na II Cs Ti II Ar II Cl II F III Na II Cs Kr IV NV Kr III Fe II Cu I Fe II Cu I NV Ne II C II C II Ti II Cu I Ti II Fe II Cu I Ti II Ti	20 20 20 2 3 3 2 4 8 4 3 5 9 5 20 7 8 4 2 1 3 2 4 2 1 5 7 1 8 3 2 2 1 5 7 7 7 8 8 8 8 8 8 9 8 9 8 8 9 8 8 8 8 8	2851,94 2851,7979 2851,743 2851,660 2851,23 2851,16 2851,087 2850,95 2850,4 2850,288 2850,25 2849,66 2849,606 2849,050 2848,955 2848,91 2848,899 2848,72 2848,332 2848,32 2848,32 2848,122 2848,32 2848,122 2848,046 2847,66 2847,66 2847,66 2847,66 2847,66 2847,36 2847,46 2847,46 2846,490 2846,490 2846,490 2846,490 2846,490 2846,48 2846,490	Ar IV Fe I Cu I Mg I Cs Kr III Ti II Xe II Cs Fe III Xe III C III C III C III Fe II Tr III Tr II	4 4 4 15 16 20 30 20 3 2 7 2 8 7 7 8 3 40 4 7 7 8 3 40 41 25 3 40 41 25 3 40 40 40 50 50 50 50 50 50 50 50 50 5
2853,13 2853,11 2853,013 2853,0 2852,811	C III Xe II Na I Kr IV Na I	16	2843,6314 2843,485 2843,369 2842,88 2842,647	Fe I Fe II Ar II Ar III Mg I	10 5 3 7 6
2852 ,415 2852 ,39 2852 ,127	Cs II Xe II Mg I	8 3 50	2842 ,632 2842 ,3345 2841 ,914	Ne I Si I Ti II	15 15 30

				5. 1.1	
λ	Symbol	I	λ	Symbol	1
2841 ,721	Na II	7	2832,49	Cu I	5
2841 ,72	F IV	2	2832,46	Xe II	2
2841 ,7	F III	3	2832,4364	Fe I	25
2841 ,5	Cs	2	2832,39	Kr II	2
2841 ,00	Kr III	30	2832,33	Cl II	4
2840,92 $2840,756$ $2840,647$ $2840,489$ $4840,4229$	Cu I	10	2832,158	Ti II	20
	Fe II	8	2832,00	Xe II	2
	Fe II	9	2831,562	Fe II	11
	Cu II	2	2831,490	Si III	7
	Fe I	6	2830,93	Cu II	3
2840 ,342	Fe II	7	2830,43	Kr II	$egin{array}{c} 3 \\ 0 \\ 2 \\ 10 \\ 2 \\ \end{array}$
2840 ,205	Al I	2	2830,36	N II	
2840 ,099	Al I	7	2830,31	Cu I	
2839 ,819	Fe II	6	2830,25	Ar IV	
2839 ,70	Ti II	15	2829,854	Na II	
2839 ,622	Si III	5	2829,60	Kr IV	3
2839 ,57	Xe III	2	2829,423	Cs II	5
2839 ,57	Xe II	2	2829,42	Cu I	5
2839 ,555	Na II	4	2829,41	Kr III	6
2839 ,535	Fe II	7	2829,358	N II	1
2839 ,20 2838 ,85 2838 ,85 2838 ,79 2838 ,1205	Kr II Xe III Xe II Kr II Fe I	2 3 3 20 10	2829 ,18 2829 ,076 2829 ,045 2828 ,87	O IV He I Cs II Ti II	2 40 5 30
2838,09	Cs	20	2828 ,8094	Fe I	7
2837,963	Al I	7	2828 ,80	Ti II	30
2837,856	Al I	2	2828 ,634	Fe II	6
2837,603	C II	18	2828 ,150	Ti II	60
2837,3685 2837,300 2837,28 2836,98 2836,710	Cu II Fe II Cs II Ti IV C II	50 5 00 0 20	2827,98 2827,91 2827,90 2827,8931 2827,584	Ne Cs II Xe II Fe I Ne I	0 00 2 5
2836 ,60	Ti II	15	2827,45	Xe III	30
2836 ,35	O II	2	2827,431	Fe II	5
2836 ,34	O III	4	2827,22	Ti II	10
2836 ,25	O IV	6	2826,94	Xe II	5
2836 ,16 2836 ,08 2835 ,94 2835 ,716 2835 ,606 2835 ,59	Xe II Kr IV Kr III Fe II F III Cl II	1 3 6 9 9	2826 ,802 2826 ,13 2826 ,081 2826 ,05 2825 ,82	Cs II F IV F III Xe III Ne III	1 5 5 20 5
2835,4574	Fe I Cl III Kr II Ne I Cs	6	2825,687	Fe I	6
2835,4		4	2825,609	Ne I	8
2835,35		8	2825,557	Fe I	20
2835,233		15	2825,28	Ne III	4
2835,01		8	2825,259	Ne I	10
2834,472	Si II	5	2824,66	Ar III	6
2834,472	Cu I	2	2824,47	Ne III	3
2834,14	Ti II	10	2824,370	Cu I	1250
2833,962	F III	8	2824,12	Cs	8
2833,18	Xe III	6	2823,80	F IV	3
2833,100 2833,00 2832,95 2832,921	Fe II Kr II Xe III Ne I	5 100 6 8	2823,77 2823,635 2823,2767 2823,03 2823,03	F III N II Fe I Cs Kr II	3 5 20 8 2

λ	Symbol	I	λ	Symbol	I
2822,95 2822,812 2822,63 2822,63 2822,05 2821,68 2821,54 2821,41 2820,95 2820,74 2820,695 2820,695 2820,632	Ne III C II Kr III Kr II Cu III Ne C II Ti II Kr III F IV C II F III Al II	7 2 6 5 1 0 1 8 4 4 4	2811,67 2811,67 2811,422 2811,112 2810,82 2810,80 2810,52 2810,276 2809,91 2809,806 2809,761 2809,63 2809,514	Kr III Xe III F III Mg I Cs Cu II Xe III Ti II Cs Fe II Mg I O III Na II	25 8 10 2 20 3 1 50 8 7
2820,580 2820,44 2820,36 2820,268 2820,06 2820,00 2819,99	Si II Ne Ti II Cs II Xe II C II Ti II	2 0 4 5 4 1 8	2809,50 2809,44 2809,35 2809,154 2809,07 2808,99 2808,84	Ne II Ar IV N IV Ti I Xe III K II O II	4 16 2 5 8 3 2
2819 ,28 2819 ,24 2819 ,13 2819 ,02 2819 ,02 2818 ,88	Cs C IV C II Xe II Ti III	2 1 1 1 1	2808 ,72 2808 ,685 2808 ,56 2808 ,07 2807 ,55 2807 ,46 2807 ,25	Kr II Na II Xe II C III Xe II F IV Xe III	I 1 4 1 2 0 10
2818,68 2818,68 2818,624 2818,302 2818,271 2818,26 2817,98	Cu I O III Fe III F III Na II Ar III Cs	4 1 6 5 2 6 20	2807,02 2806,985 2806,407 2806,39 2806,31 2806,168	Ar III Fe I Ti II Xe III C III Ar II	4 20 5 3 1 5
2817,838 2817,53 2817,5047 2817,37 2817,110 2816,943	Ti II Kr III Fe I Ti I Si III Cs II	60 2 6 3 9 20	2806,07 2806,00 2805,990 2805,791 2805,71	Kr III F IV Ar II Fe II Cu I	20 1 1 5 5
2816,87 2816,53 2816,46 2816,179 2815,94	Kr II O IV Kr II Al II Xe III	30 4 60 20 40 2	2805,694 2805,65 2805,47 2805,43 2805,08	Ti I Al II Cl III C III Xe III Ti II	6 4 2 0 2 40
2815,57 2815,33 2814,685 2814,48 2814,47	Ti II Cs Ne I Kr III Xe III Kr III	2 20 15 30 15	2804,5212 2803,97 2803,686 2803,60 2803,60	Fe I F III Cu I Kr II O IV	$\begin{array}{c} 20 \\ 0,5 \\ 10 \\ 4 \end{array}$
2813,97 2813,88 2813,613 2813,558 2813,2877 2813,241	Ca III Fe II Cu I Fe I Fe III	7 5 2 30 10	2803,45 2803,441 2803,20 2803,11 2803,02	C II Fe III Kr II O II Xe II	0 6 20 1 5
2812 ,96 2812 ,74 2811 ,781	Cu III Cu I Mg I	5 2 1	2802,95 2802,704 2802,556 2802,50	C II Mg II Cu I Xe II	0 12 10 1

					
λ	Symbol	I	λ	Symbol	I
2802,498 2802,39 2802,34 2801,43 2801,23 2801,21 2800,98 2800,919 2800,95	Ti I C II Ne III C II Kr II C II Kr II Ar II	15 0 2 5 2 5 2 1 30	2793,316 2793,18 2792,660 2792,52 2792,318 2792,16 2792,015 2791,951 2791,798	Cs II F III Ne I Xe II Ne I Cs Ne II Cu I	5 2 3 1 20 8 5 5
2800,27 2800,24 2800,22 2799,80 2799,69 2799,60 2799,536 2799,47 2799,41 2799,286	Cl II Ne III Xe III Ne I Cu II Cl II Cu II C III Cs II Fe II	4 3 20 2 2 4 5 4 10 7	2791 ,63 2790 ,776 2790 ,62 2790 ,39 2789 ,89 2789 ,86 2789 ,83 2789 ,797 2789 ,52	Ca III Mg II Ti II Li II O III O V Kr II Cs II Xe II	6 9 3 2 3 3 3 10 2
2799 ,216 2799 ,15 2799 ,01 2798 ,96 2798 ,95 2798 ,73 2797 ,998 2797 ,97 2797 ,914	N II C II O III Ne Ti III Ti III Mg II O III Fe II	5 1 2 0 1 0 10 10 1 5	2789,352 2788,96 2788,81 2788,56 2788,258 2788,24 2788,105 2788,093 2788,00	FIII Ar IV Cs FIV Fe III Cs II Fe I FIII	3 14 2 1 6 10 30 20 8
2797,7765 2797,70 2797,65 2797,44 2797,26 2797,11 2796,80 2796,49	Fe I C II Xe II Cu II Cu II Ar IV F IV Xe II	15 1 30 2 2 7 2 2	2787,9331 2787,73 2787,72 2787,38 2787,04 2787,03 2787,02 2786,89	Fe I Ne III F III F III O IV O V Cs Ne III	5 4 2 0,5 8 4 8
2796,46 2796,37 2796,26 2795,963 2795,81 2795,613 2795,528 2795,500	C III Cl III Kr II Ne I Kr II Ne I Mg II F III	3 1 2 8 30 1 13 4	2786,496 2786,17 2785,99 2785,96 2785,42 2785,39 2785,29	Cu I Ne III Ti II F IV Xe II Ar IV Ne III	$ \begin{array}{c} 10 \\ 2 \\ \hline 6 \\ 3 \\ \hline 5 \end{array} $
2795 ,425 2795 ,31 2795 ,289 2795 ,101 2794 ,86 2794 ,592	Ar II Cu II Ar II Ne I Xe III Ne I	2 2 2 35 20 5	2785 ,20 2785 ,23 2785 ,213 2784 ,666 2784 ,648 2784 ,48 2784 ,47	Ar III Fe II Cs II Ti II O III Ar IV	2 5 8 3 3 2 12
2794,56 2794,50 2794,26 2794,220 2794,2 2794,09 2793,888 2793,485	C III Cs II F IV Ne II F III O III Fe II Cu I	2 10 3 3 3 3 5 7 2	2784,10 2783,696 2783,65 2783,551 2783,37 2783,30 2783,15 2783,03	Cs Fe II Ar III Cu I Xe III F III O II Ne III	8 12 5 20 12 0 2 2

λ	Symbol	I	λ	Symbol	I
2782,972 2782,92 2782,73	Mg I Ar IV Xe II	18 3 2	2772 ,1107 2772 ,04	Fe I O III	20 2
2782 ,73 2782 ,592 2782 ,47	Cu I Cl IV	$\frac{20}{7}$	2771 ,27 2771 ,184 2770 ,79	Ca III Fe II Ca I	4 5 3
2782,46 2782,30 2782,07	O IV Ti II Ne I	$\begin{array}{c} 3 \\ 2 \\ 2 \end{array}$	2770 ,64 2770 ,508	Cl IV Fe II	4 5
2781 ,956 2781 ,68	F III Ne I	4 3	2770 ,41 2770 ,15 2770 ,06	Xe II O III Ne II	2 2 1
2781 ,42 2781 ,416 2781 ,350	Ne Mg I F III	1 18 5	2769 ,748 2769 ,69	Ar II O V	4 1 50
2781 ,288 2781 ,18	Mg I F IV	8 2	2769 ,6693 2769 ,5 2769 ,354	Cu II Cs Fe II	$\frac{2}{9}$
2781 ,05 2781 ,04 2780 ,81	O IV O V Cs	7 5 2 5	2769 ,3 2769 ,2985 2769 ,153	Cl III Fe I Fe II	3 6 6
2780 ,55 2780 ,065	Ti II Cs II Ne II	$egin{array}{c} 5 \ 3 \ 2 \end{array}$	2768 ,934 2768 ,878 2768 ,54	Fe II Cu I Kr III	8 125 4
2780 ,023 2779 ,97 2779 ,9	Kr II Cs	1 8	2768 ,349 2767 ,945	Mg I Ar II	7
2779 ,831 2779 ,64 2779 ,51	Mg I Xe III Kr II	20 5 4	2767 ,77 2767 ,673 2767 ,5232	Ne I C II Fe I	$\begin{array}{c} 2 \\ 2 \\ 3 \\ 20 \end{array}$
2779 ,299 2779 ,11 2779 ,1	Fe II Kr II Cs	11 20 8	2767 ,5232 2767 ,503 2767 ,28	Fe II Ne I	13 3
2778,99 2778,48	Kr II Ti II	$rac{2}{2}$	2767,00 2767,00 2767,00 2767,0	Xe II Ne Li II	1 7 4
2778 ,270 2778 ,2214 2778 ,03	Mg I Fe I F IV	18 20 1	2766 ,50 2766 ,371	O III Cu I	$\frac{1}{2}$ 2500
2777 ,96 2777 ,892	Kr II Fe II	1 5 2	2766 ,364 2766 ,20 2766 ,13	Ne I Xe III Ca I	3 5 1
2777 ,89 2777 ,714 2777 ,65	K II C III Ne III	5 7	2766 ,118 2766 ,095	Ca I C II Cs II	2 5
2776 ,99 2776 ,96	Cs II Xe III	15 10 5	2766 ,07 2765 ,90 2765 ,222	Ne Kr III Mg I	6 2 5
2776 ,923 2776 ,690 2776 ,26	Fe II Mg I Ar IV	18 10	2765 ,120 2764 ,821	C II Ti II	10
2775 ,049 2774 ,86	Ne I Xe II	5 15	2764 ,762 2764 ,70 2764 ,648	Cu I Ne Ar II	5 2 4
2774 ,70 2774 ,691 2774 ,59	Kr IV Fe II Kr II	6 7 3	2764,60 2764,60 2764,60	F IV Ca I	$0 \\ 2$
2774 ,46 2774 ,099	Cs Ar II	8 2	2764 ,42 2764 ,38 2763 ,88	Cs Ne Cl II	20 1 10
2773 ,73 2773 ,55 2773 ,306	Ti III Xe II Fe III	1 5 8	2763,86 2763,809 2763,804	Cu I He I	15 20
2772 ,80 2772 ,740	Ca I Ar II	1 2	2763 ,56 2763 ,520	Xe II Ar II Fe I	1 1 4
2772,60 2772,41	Kr II Xe III	10 10	2763 ,108 2763 ,00	Xe III	1

λ	Symbol	I	λ	Symbol	I
2762,922 2762,815 2762,77 2762,460 2762,324 2762,23 2762,22 2762,05 2762,0275 2761,97 2761,813 2761,785 2761,60 2761,30 2761,30 2761,291 2760,852 2760,76 2760,48	Ne II Al III Xe II Al III Al III Ne I Ar III Ti II Ca I Fe I Cs II Fe II Fe II Xe III O III Ti II Al II Xe III Al III	3 9 2 2 3 7 2 15 8 9 18 12 3 7	2752,47 2752,24 2751,828 2751,810 2751,8 2751,70 2751,59 2751,59 2751,29 2751,23 2751,123 2751,11 2750,878 2750,786 2750,36 2750,1415 2749,839 2749,734	O III O V C III Cu I F III Ti II Kr II Cl II Cu I Cl IV Fe II Cs Fe I Cu I Kr III Fe I Cs II	0 0 3 10 1 50 5 5 10 5 6 2 5 10 25 8
2760 ,25 2759 ,817 2759 ,81 2759 ,589 2759 ,323 2759 ,02 2758 ,69 2758 ,64 2758 ,36 2758 ,35 2758 ,066	Cu I Fe I F III F III Ne I Kr II Cl II Ne I Xe II Ti II	2 5 5 10 2 4 5 3 4 2 20	2749,484 2749,34 2749,324 2749,184 2749,031 2748,23 2748,18 2748,065 2747,88	Fe II Ca I Fe II Fe II Fe II Cs II Kr IV Al I Xe III	12 1 14 13 5 15 8 3 8
2757,92 2757,86 2757,81 2757,62 2757,40 2757,374 2757,3170 2757,304 2757,025	Ar IV Xe II Cs II Ti II Ca I Ti I Fe I Ar II Fe II	14 40 7 3 2 6 10 3 5	2747,46 2747,41 2747,282 2746,982 2746,70 2746,488 2746,483 2746,31	O II Kr II C II Fe I Cu I Ti II C II Fe II Kr II	6 2 12 20 20 30 10 14 15
2756,617 2756,664 2756,53 2756,512 2756,3295 2756,2677 2756,22 2755,82 2755,737 2755,69 2755,556 2755,20	Ne II F III Kr III Fe II Fe I O III Ne I Fe II Cu I F III Cs	3 5 8 5 20 20 1 1 15 15 5 7 20	2745,49 2745,452 2745,2710 2745,00 2744,838 2744,797 2744,64 2744,5287 2744,51 2744,0691	Ca I Cu I Cu II O III Ti I Ar II Kr II Fe I F IV Fe I Kr III	1 20 20 2 5 6 1 8 1 10
2755,307 2755,13 2754,907 2754,864 2754,10 2753,287 2752,85 2752,8	F III O V Fe II Ar II Cl II Fe II Ti II F III	4 2 6 2 25 12 4 1	2744,04 2743,89 2743,62 2743,55 2743,53 2743,196 2743,16 2743,03 2742,56	Xe II Ar III O V K II Ne I Fe II Xe II Kr III	2 3 0 4 15 14 2 3 40

λ	Symbol	I	λ	Symbol	I
2742,4064 2742,30 2742,297 2742,2554 2742,13 2742,05 2741,962	Fe I Ti II Ti I Fe I Kr IV Kr III Ar II	30 8 15 20 20 5	2733,45 2733,022 2732,64 2732,504 2732,335 2732,33 2732,33	Xe II Ar II Ne I Ar II Ar II Kr II Li I	25 4 1 6 1 4 2
2741,84 2741,397 2741,186 2741,067 2740,980 2740,912 2740,80 2740,73	Kr III Fe II Li I Ar II Al I Ar II Xe III Cs II	2 6 10 2 4 1 12 15	2731,993 2731,93 2731,8 2731,639 2731,583 2731,528	Mg I Cu II Cs Ar II Ti I Ne I	8 2 2 1 7
2740 ,73 2740 ,333 2740 ,31 2740 ,11 2739 ,808 2739 ,7658 2739 ,63	Ar II F III Kr II Ti I Cu II F II	1 1 1 1 15 8	2731 ,46 2731 ,44 2731 ,37 2731 ,358 2731 ,141 2730 ,95 2730 ,738	Xe II O V N II Ne I Ti I Ti II Fe II	1 0 1 3 4 6 11
2739 ,546 2739 ,15 2739 ,11 2738 ,70 2738 ,13 2737 ,954 2737 ,608	Fe II O III F III Ti II Kr II F III Cu I	15 0 1 3 1 4 2	2730 ,7 2730 ,61 2730 ,55 2730 ,41 2730 ,065 2729 ,46 2729 ,35	Li II C II Kr IV Kr III Cs II Kr II O V	5 1 3 5 5 30 1
2737 ,3422 2737 ,3108 2736 ,968 2736 ,96 2736 ,91 2736 ,65 2736 ,542	Cu II Fe I Fe II K III F V Kr IV Mg I	10 20 12 0 0 2 12	2729 ,213 2728 ,707 2728 ,4 2728 ,22 2728 ,0212	C II C II Li II Xe III Fe I	2 4 2 4 5
2736 ,477 2735 ,69 2735 ,614 2735 ,613 2735 ,4762 2735 ,283	Ne I Ne I Fe I Ti I Fe I Ti I	5 8 8 6 8	2727,80 2727,7 2727,539 2727,47 2727,420 2727,382	Cs Cl III Fe II F III Ti I Fe II	2 2 13 0 8 8
2735,168 2735,14 2734,858 2734,85 2734,85 2734,82 2734,755	Ne I O III Cu I Cs Ca I Ne I	$\begin{array}{c} 3 \\ 1 \\ 10 \\ 2 \\ \end{array}$	2727,36 2727,22 2726,95 2726,802 2726,702 2726,30	C II Xe III O III Cs II Si II Cs II	2 4 1 1 5 0
2734,702 2734,14 2733,879 2733,8 2733,5816 2733,493	N II Xe II Cs II F III Fe I Mg I	2 50 5 0,5 15	2726,054 2725,90 2725,79 2725,30 2725,081 2724,9542	Fe I C III Ti II C III Ti I Fe I	6 7 3 7 10 10
2733 ,36 2733 ,34 2733 ,32 2733 ,264 2733 ,26	Kr IV O II He II Ti I Kr II	2 10 100 30 50	2724 ,885 2724 ,85 2724 ,84 2724 ,772 2724 ,21	Fe II C III Ar III Ne I Cs II	9 6 10 3 10

λ	Symbol	I	λ	Symbol	1
2724,03 2724,01 2723,953 2723,95 2723,812 2723,5786 2723,40 2723,25 2723,25 2723,191 2722,737 2722,702 2722,702 2722,702 2722,040 2721,645 2721,66 2721,28 2721,06 2721,28 2721,06 2720,918 2720,9035 2720,62 2720,199 2720,184 2719,90 2719,89 2719,61 2719,097 2719,097 2719,095 2719,097 2719,097 2719,097 2719,097 2719,097 2718,90 2718,847 2718,79 2718,75 2718,64 2718,64 2718,64 2718,639 2718,4365 2718,4365 2718,34 2717,366 2717,304 2717,62	CI IV CI III O IV Cu I Cs Si IV Fe I Xe II F IV F III He I Al II Fe II Cu I Cu I Cu I Cu I Cu I Cu I Ti II Fe II Cu I Ti II Fe II Cu I Fe II Cu I Ti II Fe II Cu I Fe II Cu I Ti II	5 5 2 30 8 3 15 1 0 1 10 2 5 5 5 10 2 1 0 1 40 2 15 2 5 1 5 6 0 1 1 2 1 5 6 0 1 1 1 2 1 1 2 1 3 1 3 1 3 1 3 1 3 1 3 1	2714,54 2714,49 2714,412 2714,38 2714,37 2714,35 2714,08 2714,00 2714,00 2713,95 2713,76 2713,54 2713,5079 2713,40 2712,88 2712,77 2712,40 2712,88 2711,88 2711,88 2711,88 2711,6560 2711,6 2711,11 2710,59 2710,5 2710,37 2710,27 2710,27 2710,27 2709,837 2709,82 2709,60 2709,03 2709,05 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03 2709,03	Cu I Kr II Fe II Cl III Cl III N III N III Cs Cu I N III Ne F IV Cu II O III Fe II Cu II Cu II Fe II Cu II C	2 3 13 8 2 1 3 2 2 5 1 0 50 2 0 4 80 6 0 5 9 4 2 2 1 2 7 2 3 6 2 4 1 5 3 7 10 1 2 1 1 6 2 20 2 6 20
2716,860 2716,218 2716,20 2716,16 2715,8 2715,76 2715,543	Ar II Fe II Ti II Kr II Cs Xe II Cu I	2 9 4 10 2 3 20	2706 ,76 2706 ,74 2706 ,66 2706 ,5829 2706 ,566	CI II Ne F IV Fe I Fe II	4 1 1 8 7
2715,345 2715,45 2715,35 2715,19	O II Cu I Kr III	5 5 7	2705 ,18 2705 ,117 2704 ,87 2704 ,32	Cu I Fe III Ca III Ne I	2 2 7 6 2.

λ	Symbol	I	λ	Symbol	I
2704 ,1	Cs	2	2695,150	Fe III	10
2703 ,989 2703 ,96	Fe II F V	10 1	2695,08	F IV	1
2703,95	Cs II	3	2694 ,81 2694 ,63	Kr III Cl II	$\frac{20}{3}$
2703,44	Xe II	10	2694,538	Fe I	5
2703 ,184 2702 ,65	Cu II Cu I	30 10	2694 ,080 2693 ,98	Cu I F V	5 1
2702,554	Ne I	3	2693,723	Mg I	3
2702 ,34 2702 ,30	Xe II F V	$\frac{2}{1}$	2692,836	Fe II	5
2702,30	Xe II	$\frac{1}{2}$	$\begin{array}{c} 2692,790 \\ 2692,74 \end{array}$	F II O III	5 1
2701,95	Ti III	1	2692,597	Fe II	10
2701 ,766 2701 ,719	Ne I Ar II	$rac{2}{2}$	2692,596	Ar II	5
2701,719	Ne I	$\frac{2}{2}$	$ \begin{array}{c} 2692,45 \\ 2692,15 \end{array} $	Mg I Ti III	$\frac{2}{1}$
2701,36	Cl IV	4	2691,86	Kr III	4
2701,34	Kr II	15	2691 ,83	Cs	2
2701 ,19 2701 ,13	Cs II Fe III	4 8	2691,52	Cl III	5
2701,10	OIII	$\ddot{3}$	2691,40 2691,20	Xe II Kr II	1 2
2700,963	Cu II	30	2690,49	NII	1
2700 ,681 2700 ,60	Ne I Kr II	$\frac{2}{3}$	2690,23	Kr III	15
2700,555	Ne I	8	2690,033	Ar II	$\frac{2}{5}$
2700,30	Cs	8	2689,90 2689,49	K III Mg I	1
2700,045	Fe III	8 1	2689,412	Cs II	5
2699 ,79 2699 ,16	Cl III Cs	8	2689,39	Cl II	6
2699,1075	Fe I	6	2689,2998	Cu II N III	50 4
2698 ,71	Kr III	2	2689,26 2689,2130	Fe I	8
2698 ,67 2698 ,56	C IV Cl II	$rac{4}{2}$	2689,093	Ar II	$\frac{2}{10}$
2698 ,52	Ti II	30	2688,826	Ti I	
2698 ,46 2698 ,414	Cu III Fe III	3 7	2688,728 2688,37	Al II Kr II	$\frac{2}{4}$
2698,414	Mg I	6	2688,11	F IV	2
2698 ,07	Kr III	3	2688,04	Cl II Ca III	150 8
2697 ,75 2697 ,75	C IV	4 7	2687,78		
2697,462	Fe II	5	2687,53 2687,395	O III Ar II	5 1
2697,42	CIII	3	2687,03	Xe III	5 5
2697,30	Kr III	$\frac{25}{7}$	2687,03 2687,01	Xe II N III	5 3
2697 ,905 2696 ,64	Fe III N III	1	!		
2696,59	Kr III	25	2686,75 2686,73	Ne Ca III	$\frac{3}{3}$
2696,50	Xe III	8	2686,60	Cs II	10
2696,39	Cu III Fe I	6 5	2686,322 2686,14	Ar II O III	$\frac{2}{10}$
2696 ,284 2696 ,19	N III	2	Ji		3
2696,119	He I	7	2686 ,14 2685 ,63	Xe II Ar III	6
2696 ,11	O III	2	2685,58	Xe III	$\frac{2}{1}$
2696,00	O III	$\frac{3}{30}$	2685,58 2685,40	Ne Cl III	1 4
2695 ,70 2695 ,49	Kr II O III	6	1		1
2695,45	FIV	3	2685,33 2685,137	Ne Ti I	
2695,45	F III	4	795, 2684	Ti I	3 5 5
2695 ,314	Fe III	9 5	2684,76 2684,751	Cl III Fe II	3 10
2695 ,181	Mg I	J	200-1,101		

λ	Symbol	I	λ	Symbol	I
2683,65 2683,55 2683,280 2683,094 2682,63 2682,60 2682,41	O III Kr II Al II Ar II Ar IV F IV O IV	4 15 3 3 9 1 2	2674,62 2674,57 2674,54 2674,4 2674,170 2674,02	Cs O III F III Li II Ar II Ar III	2 8 1 2 2 8 2
2682,40 2682,210 2681,99 2681,42 2681,34 2681,19 2680,88 2680,72	Cl III Si II Cs O III Cs Kr III Cl III Kr III	3 10 8 2 8 40 2 7	2674,0 2673,24 2673,0 2672,959 2672,79 2672,79	Cs Cs II Kr IV C III Kr III Kr II	6 2 5 3 3
2680,42 2680,433 2680,340 2680,32 2679,923	Ne I Na I Na I Kr III Ti I	1 7 8 30 20	2672,22 2672,193 2672,19 2672,05 2671,829 2671,43	Xe II Si IV Cl II Cu I Na II Cl II	4 1 50 5 6 6
2679,62 2679,60 2679,37 2679,19 2679,0626 2678,92	Kr III N II Cl II Ne I Fe I Cs	15 1 5 2 10 20	2671 ,318 2671 ,204 2671 ,17 2670 ,67 2670 ,240	C III Cu I Cs II Kr III C III	$\begin{array}{c} 4 \\ 20 \\ 4 \\ 20 \\ 3 \end{array}$
2678,810 2678,64 2678,54 2678,38 2678,086 2677,906	Fe III Ne III Xe III Ar III Na II Si II	6 25 1 9 5 3	2670,10 2669,960 2669,792 2669,592 2669,553 2669,52	O III C II Cs II Ti I Mg I Cl III	2 3 10 15 8 3
2677,90 2677,87 2677,87 2677,81 2677,57 2677,42	Ne III Ar III Ne I O III Si IV F III	30 3 2 3 4 0	2669,36 2669,166 2669,13 2669,00 2668,76 2668,25	Ne Al II Ne I Xe III Cs F III	1,5 10 3 10 8 2
2677,36 2677,20 2677,18 2677,135 2677,09 2677,020	Ne Kr II Xe II He I O IV Ne I	3 6 50 5 2 1	2668 ,124 2668 ,02 2667 ,36 2666 ,8133 2666 ,635 2666 ,61	Mg I Xe II Cl II Fe I Fe II Kr II	$egin{array}{c} ar{6} \\ 5 \\ 40 \\ 8 \\ 10 \\ 6 \end{array}$
2677,01 2676,95 2676,46 2676,428 2676,08 2676,00	Cs Cl II Ar III Cu I Cu II Kr III	2 100 4 20 2 8	2666,59 2666,46 2666,358 2666,2910 2665,69	Cu I Cl II Cs II Cu II O III	$\begin{array}{c} 2 \\ 20 \\ 1 \\ 20 \\ 7 \end{array}$
2675,78 2675,64 2675,4 2675,34 2675,31	N II Ne I Cl III O IV Kr II	2 200 2 2 2 4	2665,54 2664,664 2664,390 2664,37 2664,00	Cl III Fe II F III Kr II Kr II	6 10 3 4 8
2675 ,249 2675 ,24 2675 ,120	Si IV Ne I Si IV	$200 \\ 4$	2663 ,38 2663 ,29 2662 ,271 2663 ,22	Xe II He I O IV	2 3 4 2

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$						
2662,62	λ	Symbol	I	λ	Symbol	I
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2663,20 2662,62 2662,57 2662,29 2662,29 2661,65 2661,65 2661,47 2661,22 2661,00 2660,97 2660,817 2660,755 2660,386 2660,24 2660,22 2659,781 2659,60 2659,28 2658,74 2658,71 2658,26 2658,251	Cl III Cs II Kr II Cl III O IV Ti I Cl III Kr II Kr II Kr II Na II Kr II Mg II Mg II Al I Cs II Ar III Si II Kr II Xe III Cl II Cs Xe III Fe II	3 1 2 3 2 10 5 5 1 1 7 8 8 8 12 5 3 5 2 1 100 2 3 5 3 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2651,550 2651,19 2651,01 2650,96 2650,7 2650,492 2650,20 2650,10 2649,840 2649,67 2649,599 2649,464 2649,27 2649,062 2648,69 2648,60 2648,56 2648,43 2648,43 2648,15 2648,15 2648,15	F III Cl III Ne Kr III Cs Fe II Xe III Al II Cu I Kr II Ar II Fe II Kr II Kr III Cu II Kr III Col II F IV Kr III	3 3 6 1 20 4 1 4 30 4 2 4 20 4 10 3 25 4 15 10 0 20
2655,803 Si II 3 2646,20 Cs 8 2655,512 Si III 14 2655,39 Xe II 2 2646,176 N IV 11 25 12646,176 N IV 11 2646,176 N IV 11 26	2658,00 2657,52 2657,406 2657,3 2657,178 2657,00 2656,83 2656,475 2656,38 2656,303	Kr III Ne I Al I Li II Ti I Xe II Cs F III Kr II Ar II	2 15 3 1,5 10 5 2 6 15 2	2647,844 2647,79 2647,76 2647,5588 2647,42 2647,247 2646,956 2646,88 2646,87 2646,751 2646,631	Ar II Cl II Ne I Fe I Ne I Ar II N IV Cl II N II Fe III Ti I	1 5 8 5 200 6 12 25 0 6 40
2654,63 Ar III 10 2646,02 N II 0 2654,056 Ar II 2 2645,654 N IV 7 2653,95 Kr II 6 2645,645 Ne I 35 2653,77 Ar III 4 2653,757 F III 5 2645,539 Si II 5 2645,51 Ne 6	2655,803 2655,512 2655,39 2654,921 2654,63 2654,056 2653,95 2653,77 2653,757	Si II Si III Xe II Ti I Ar III Ar II Ar III F III	3 14 2 5 10 2 6 4 5	2646,20 2646,19 2646,176 2646,08 2646,02 2645,654 2645,645 2645,539 2645,539	Cs Ne I N IV Ti II N II N IV Ne I Si II Ne	8 15 11 50 0 7 35 5 6
2653,491 F III 4 2645,47 Ar III 2 2653,252 F III 2 2645,39 Fe III 9 2652,899 Ar II 1 2 2645,303 Cu I 20 2652,848 He I 3 2644,801 Mg I 2 2644,801 Mg I 2 2652,065 Cu I 2 2644,69 Cs II 5 2651,958 F III 3 2644,253 Ti I 40 2651,703 F III 3 2644,000 Fe I 8 2651,71 Cs II 12 2643,93 N II 4 2654,693 Cu II 12 2643,93 N II 4 2654,693 Cu II 10 2643,92 Cu III 40	2653,491 2653,252 2652,899 2652,848 2652,475 2652,065 2651,958 2651,906 2651,723 2651,71 2651,693	FIII FIII Ar II He I Al I Cu I FIII Ar II FIII CS II Cu I	4 2 1 3 12 2 3 2 3 12 12	2645,47 2645,39 2645,303 2644,801 2644,802 2644,69 2644,253 2644,16 2644,000 2643,93 2643,92	Ar III Fe III Cu I Mg I He I Cs II Ti I Ne I Fe I N II Cu III	0 2 9 20 2 2 5 40 5 8 1 40 3

λ	Symbol	I	λ	Symbol	I
2643,413 2643,06 2642,63 2642,47 2642,42 2642,331 2642,28 2642,25 2642,15 2642,08 2641,74 2641,6468 2641,550 2641,54 2641,53 2641,425 2641,12 2641,089 2641,07 2641,00 2641,00 2640,98 2640,894 2640,894 2640,788 2640,74 2640,68 2640,560 2640,56 2640,56 2640,56 2640,56 2640,36 2640,36 2640,36 2640,36 2639,553 2639,47 2639,76 2639,553 2639,47 2639,18 2639,05 2639,04 2638,70	N II Kr II Cs Ne II Ne III C II Cl II Ne III Ti II Kr III Kr III Cu I Cu III Cu III Cu III Co III F III Xe III Ti I Ne III F III Ne III F IV Ne III F IV Ne III F III Ne III F III I I I I I I I I I I I I I I I	2 20 20 8 3 3 4 2 20 4 2 4 5 8 8 2 5 40 10 2 4 2 3 5 11 2 2 1 1 6 3 5 6 6 7 1 6 7 1 7 1 8 7 7 7 8 7 8	2635,37 2635,17 2635,11 2635,03 2634,95 2634,933 2634,8 2634,49 2634,41 2634,20 2634,17 2634,17 2634,17 2633,18 2632,873 2632,873 2632,873 2632,414 2632,40 2631,609 2631,553 2631,33 2631,33 2631,33 2631,33 2631,33 2631,33 2631,323 2631,25 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2631,051 2630,93 2630,066 2630,066 2630,053 2630,004 2639,587 2629,587 2629,587 2629,587 2629,587 2628,86 2628,86 2628,86 2628,86 2628,86 2628,46 2628,292	F IV Al II K III Al II Cl II Cu I F III F IV Kr II Xe II Cs Ca III Ar II Xe II Fe II O IV Cl III Ti I Ar III Fe II Ar III Fe II Si I Xe II Fe II Fe II Kr III Fe II Kr III Fe II Kr III Fe II Kr III Fe II	3 1 5 3 12 30 0,5 0 6 2 2 6 2 2 5 5 8 4 5 15 4 4 7 8 7 2 13 190 2 13 1 15 6 3 4 8 6 20 8 5 8 5 2 5 2 3 2 1 13
2636,906 2636,725 2636,51 2636,354	Ar II Al II Kr II Ar II	$\begin{bmatrix} 2 \\ 6 \\ 3 \\ 2 \end{bmatrix}$	2628 ,08 2627 ,952 2627 ,84 2627 ,75	Kr III Cs II Cs Kr II	6 5 8 7
2635 ,882 2635 ,8400 2635 ,60	Ne I Cs II Fe I Ti II	25 1 8 5	2627,74 2627,68 2627,397 2627,365 2627,22	F IV Al II Ar II Cu I Kr II	2 7 3 20 3

2626,678						
2626.500 Fe II 6 2617.3 F III 1 2626.502 AT IV 2 2 2617.26 AT III 1 4 2615.606 Fe II 13 2617.149 Fe III 8 2616.506 Fe II 13 2616.607 C IIII 4 2 2616.811 AT II 3 2616.97 C IIII 4 2 2616.811 AT II 3 2616.57 C IIII 4 2 2616.811 AT II 3 2 2616.811 AT II 3 2 2616.811 AT II 3 2 2616.827 C III 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	λ	Symbol	I	λ	Symbol	I
2619,22	2626,678 2626,500 2626,32 2625,711 2625,666 2625,64 2625,51 2625,490 2625,000 2624,92 2624,78 2624,71 2624,593 2624,52 2623,721 2623,69 2623,721 2623,69 2622,90 2622,90 2622,87 2622,85 2622,85 2622,85 2622,85 2622,81 2621,87 2621,87 2621,668 2621,39 2621,36 2621,11 2621,10 2620,985 2620,6663 2620,65 2620,6663 2620,65 2620,44 2620,407 2620,20 2620,05 2620,04	Cu I Fe II Ar IV Ar II Fe II Kr III F IV Fe II F III Ar IV Kr II Cl III Ar II Xe III Fe I Kr III O III Fe I Kr III O III Fe I I Cu I N III Kr II O III Fe II CI II Fe II Xe II CI II Fe II Xr II CI II Fr II CI II	10 6 2 1 13 2 0 9 7 12 6 3 3 1 5 2 2 1 4 10 2 12 1 7 2 4 6 7 5 6 4 6 7 5 6 4 6 7 5 6 7 6 7 6 7 6 7 6 7 7 8 7 8 7 8 7 8 7 8	2617,513 2617,3 2617,26 2617,149 2616,97 2616,811 2616,627 2616,62 2616,27 2615,87 2615,87 2615,19 2615,13 2614,726 2614,65 2614,65 2614,47 2614,478 2614,41 2614,26 2613,95 2613,94 2613,823 2613,6 2613,59 2613,44 2613,41 2613,357 2613,083 2612,45 2611,476 2610,440 2610,03	Mg I F III Ar III Fe III Cl III Ar II Kr II C III Ne I Cs II Ne III Cl II Mg I Cl II Cs II Cu II Ne I Cu II Ne I Fe II Cs Ne III Cs II I I I I I I I I I I I I I I I	3 1 1 8 4 3 10 4 25 10 10 12 8 3 10 2 5 8 4 5 8 5 3 2 13 2 30 3 12 1 5 2 2 13 7 8 2 4 25 3 6 10 0 0,5 1 15
2618,366	2619 ,77 2619 ,22 2619 ,076 2619 ,02	Ne Cs Fe II Ne Cl III	2 7 1,5 4	2609 ,66 2609 ,59 2609 ,5	Kr III O III Kr IV	1 4 10
	2618,366 2618,0191 2617,66 2617,616	Cu I Fe I Ca I Fe II	5 3 12	2609 ,31 2609 ,122 2608 ,90	Cu III Fe II Xe III	50 5 6

λ	Symbol	I	λ	Symbol	I
λ 2608,44 2608,24 2608,06 2607,52 2607,087 2606,93 2606,8286 2606,621 2606,504 2606,77 2605,657 2605,657 2605,62 2605,41 2605,41 2605,41 2605,41 2605,41 2605,41 2605,41 2605,41 2605,41 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,121 2605,140 2604,883 2604,863 2604,863 2604,35 2604,11 2603,854 2604,11 2603,854 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,72 2603,79 2602,495 2602,495 2602,495 2602,11 2602,02 2601,42 2601,05 2600,956	Ar IV Cl II Fe III Ar IV Xe II Fe II Xe II Fe I Mg I Fe II Kr IV F III Cl II Fe I C II Kr II Co II Co II	7 2 7 10 1 13 5 6 5 7 5 5 6 1 50 6 1 6 20 6 3 25 1 ,5 6 2 3 4 8 8 2 4 2 1 5 10 3 0 2 2 1 7 2 2 4 1 3	2598,369 2597,73 2597,69 2597,25 2597,48 2597,01 2596,95 2596,86 2596,79 2596,564 2596,5 2595,886 2595,622 2595,488 2595,622 2595,488 2595,36 2595,295 2594,965 2594,965 2594,41 2594,40 2594,34 2593,97 2593,919 2593,869 2593,726 2594,41 2594,40 2594,34 2593,97 2593,919 2593,869 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,65 2593,726 2593,65	Fe II Kr II O III Ar III Al II Xe II Cs Xe II O III Kr II Ti I F III Mg I Cs II Ne III F III Kr II C IV Ne C IV Na II Na I Ar III Na I Fe II Cu I Ti I Ne III F III Kr II Cu I Ti I Ti I The III Cu I Ti I The III The	14 7 8 3 6 4 20 5 00 5 10 1 2 3 20 8 7 4 3 6 4 1 2 2 2 3 3 6 6 9 1 1 2 2 3 3 6 6 6 9 1 1 1 2 2 2 3 3 3 6 6 6 6 9 1 1 1 1 2 2 2 3 3 3 4 4 4 4 4 4 5 6 6 6 6 6 6 6 6 6 6 7 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8
2600,551 2600,36 2600,2711 2599,885 2599,570 2599,47 2599,396 2599,230	FIII Cs Cu II Ti I Fe I Ar IV Fe II F III	20 20 25 6 12 14 8	2591,69 2591,543 2591,44 2591,410 2591,25 2591,17 2591,15 2590,938	Xe III Fe II N V C II Kr II Cs Ne I N II	4 10 1 2 1 20 3 5
2598 ,8125 2598 ,7 2598 ,42	Cu II Cs Xe II	$\frac{20}{2}$	2590,81 2590,74 2590,67 2590,5290	N V Kr II Ne I Cu II	2 2 10 15

λ	Symbol	I	λ	Symbol	I
2590 ,45 2590 ,34 2590 ,247 2590 ,09 2590 ,04	Xe III Ca III Ti I Cs II Ne III	2 2 5 10 40	2577,19 2577,1514 2577,13 2577,12	F III Si I Cl III Cu I	2 45 5 2
2589 ,48 2589 ,47 2589 ,3 2589 ,08	Ne I Kr III Cs Kr II	2 3 2 30	2576,97 2576,865 2576,74 2576,43	Xe II Fe II Cs II Ti III	15 7 10 5
2588 ,80 2588 ,285 2588 ,23 2587 ,999	Cl III Mg I O III Fe I	3 3 0 8	2575,433 2575,397 2575,300 2575,095	O II Al I O II Al I	1 8 10 10
2587,948 2587,09 2586,95 2586,9	Fe II Ca III Al II Kr IV	7 3 6 3	2575,07 $2574,945$ $2574,838$ $2574,826$ $2574,55$	Cs II Mg I Fe III C II Ne I	$\begin{array}{c} 3 \\ 2 \\ 7 \\ 10 \\ 8 \end{array}$
2586 ,78 2586 ,312 2586 ,274 2585 ,876	Kr III Na II Ti I Fe II	3 2 3 13	2574,54 2574,368 2574,13 2573,596	Cs II Fe II Cl III F III	10 9 0 4
2585,558 2584,88 2584,5370 2584,216	Mg I Xe II Fe I Mg I	2 1 8 1	2573,09 2573,03 2572,648 2572,30	Ca II Cs II Ti II Xe III	3 30 5 1
2584,15 2584,038 2583,760 2583,39	Kr II Fe III F III Ar III	3 6 7 3 3	2572,30 2572,248 2572,03 2571,79	O III Mg I Kr II Cs II	2 1 10 2
2582,99 2582,901 2582,585 2582,5	O III C I Fe II Cs	5 10 2 8	2571 ,76 2571 ,7563 2571 ,476	C II Cu II O II	1 10 8
2582 ,37 2582 ,299 2581 ,74 2581 ,05	Fe III Fe I Kr II Cs II	6 5 0 5	2571 ,19 2571 ,10 2571 ,036 2570 ,917 2570 ,908	Kr III Cl II Ti II F III Mg I	6 8 20 4 0
2580,803 2580,67 2580,587 2580,57	Ti I Cl III Mg I Cu I	6 1 5 5	2570 ,841 2570 ,800 2570 ,57 2570 ,525	Fe II Cu I C II Fe II	7 10 2 5
2580 ,43 2580 ,40 2580 ,360 2580 ,17	Ti III Cl II Ar II Ar III	4 1 2	2570,48 2570,411 2570,26	Kr III Ar II Xe III	10 4 1
2580,031 2579,846 2579,428 2579,29 2579,0	F III F III Ar II Cu I Kr IV	$\begin{array}{c} 6 \\ 3 \\ 2 \\ 20 \\ 2 \end{array}$	2569 ,984 2569 ,983 2569 ,888 2569 ,601	Ar II Al I Cu I Fe I	3 10 10 6
2578 ,98 2578 ,62 2578 ,36	Kr II Xe III Xe III O III	2 2 5 00	2569 ,53 2569 ,21 2569 ,202 2569 ,11	Ar IV O III Ar II O III	7 2 4 1
2578 ,27 2578 ,26 2578 ,24 2577 ,923 2577 ,888	Cl III O IV Fe II Mg I	5 4 9 0	2568,69 2568,6407 2568,405 2568,25 2568,17	Cs II Si I Fe II Cl II Cs II	15 85 6 3 10

λ	Symbol	I	a	Symbol	I
2568 ,13 2568 ,07 2567 ,983 2567 ,727 2567 ,53	Cl III Ar IV Al I Ar II Ti III	4 10 10 1 8	2559 ,281 2559 ,210 2559 ,10 2558 ,62	Ar II Si III Kr II N II	3 14 8 0
2567,330 2567,095 2566,912 2566,61 2566,23	Cu I Ar II Fe II Kr II Cl III	2 1 9 1	2558,60 2558,20 2558,08 2558,06 2558,00 2557,93	Ca I Ca I Kr IV O III Kr III F IV	2 2 4 8 5 2
2566 ,218 2566 ,01 2565 ,782 2565 ,68 2565 ,42	Fe II Cl II Ar II Al II Ti III	5 5 3 4 8	2557 ,9 2557 ,71 2557 ,55 2557 ,4 2557 ,226	Cl III Al II Kr III Li I Mg I	3 5 1 —
2565 ,29 2565 ,20 2565 ,02 2564 ,937 2564 ,84	Cl II Ca I Cs II Mg I Cl II	15 2 1 1 20	2557,206 2557,18 2556,78 2556,586 2556,58	Si II Ca I Al II Ar II Ti III	1 2 3 4 1
2564 ,8242 2564 ,416 2564 ,13 2564 ,09 2563 ,955 2563 ,6787	Si I Ar II Cl II Ca I Cu I Si I	20 4 6 3 3	2556,36 2556,12 2556,01 2555,988	Kr II C II F II Al II Ti II	6 0 4 4 10
2563,553 2563,474 2563,42 2563,32 2563,319	Cu I Fe II Ti III Na III N II	3 12 15 25 3	2555,91 2555,66 2555,59 2555,447 2555,13	Kr II C II F IV Fe II Kr III	6 1 00 7 10
2563 ,29 2563 ,25 2563 ,167 2562 ,534 2562 ,52	Ar III Kr III Cu I Fe II Cl III	5 30 10 13	2555,066 2554,82 2554,8 2554,530 2554,478	Fe II Ca I Cs Si II C II	5 2 2 10 3
2562 ,413 2562 ,305 2562 ,259 2562 ,17 2562 ,090 2562 ,04	F III Li I Mg I Ar IV Ar II Kr II	4 5 1 12 6 1	2554,47 2554,25 2554,20 2553,81 2553,61	F IV Kr III Xe II Kr III Na III	1 8 1 1 25
2561 ,954 2561 ,943 2561 ,94 2561 ,79 2561 ,545	Ar II N II Kr II Ne I N II	1 2 3 8 1	2553,61 2553,422 2553,400 2553,32 2553,29 2553,193	O IV N II Ar II Cu II Cu I Fe I	2 4 2 3 2 7
2561,48 2560,941 2560,89 2560,853 2560,37	Xe II Mg I Xe II Ar II Cs	2 0 3 1 8	2553,16 2552,29 2552,12 2552,00 2551,70	Kr III F III Al II Cs II Xe II	8 0 5 2 3
2560 ,272 2560 ,243 2559 ,912 2559 ,774	Fe II N II Fe II Fe II	7 3 5	2551 ,7 2551 ,64 2551 ,61 2551 ,571	Li II N II F IV Ar II	1 2 1 1
2559,614 2559,50	Al II Cl III	3 3	2551 ,49 2551 ,17	Kr III Cs II	$\frac{2}{10}$

λ	Symbol	I	λ	Symbol	T T
λ 2551,098 2551,094 2550,89 2550,680 2550,65 2550,02 2550,02 2550,02 2549,85 2549,788 2549,68 2549,62 2549,6142 2549,51 2549,453 2549,399 2549,30 2549,082 2548,925	Fe III Fe I F III Fe II Cs II Al II Fe II K III K III Cl II Ar II F III O III FE I Kr III FE II	6 8 1 8 7 3 8 6 6 50 3 2 2 10 2 8 8 1,5 7	2544,72 2544,685 2544,685 2544,046 2543,98 2543,92 2543,872 2543,841 2543,45 2543,431 2543,4 2543,4 2542,89 2542,767 2542,768 2542,68 2542,65 2542,41 2542,18 2542,18	Symbol Kr III Ar II F III Si II Cl II Cs Fe I Na I C II Fe II F III Fe II Na III Fe II O III Cl III CI III CI III CS III FO III CS III	3 6 4 3 10 20 6 2 1 2 5 1 9 10 6 5 5 2
2548,741 2548,69 2548,60 2548,590 2548,55 2548,45 2548,43 2548,40 2547,98 2547,76 2547,45 2547,45 2547,330 2547,330 2547,30 2547,0 2546,98 2546,98 2546,85 2546,85	Fe II Ti III Kr III Fe II Ti III F IV Cs II F IV Ti III Cl II Cu I O III C II Fe II Ti IV Ar II Kr IV F IV Cl II Ar II Ti IV C II	7 1 4 6 1 00 2 0 0 12 10 2 1 5 3 2 6 0 20 2 12 2	2542,101 2541,910 2541,831 2541,75 2541,49 2541,40 2541,03 2540,9734 2540,88 2540,84 2540,83 2540,70 2540,666 2540,55 2540,39 2540,38 2540,38 2540,38 2540,39 2540,38 2540,38 2540,02	Fe I Ti I Fe II Si III Ti IV Ca III Ca I Fe II F III C II C II CI III CS II Al II Ar IV C II Al II Ar II Ti III	6 20 7 25 8 6 0 7 1 10 1 3 3 1 6 4 3 5 4 3 15
2546,67 2546,667 2546,43 2546,36 2546,23 2546,1 2546,093 2546,0 2545,9795 2545,642 2545,60 2545,215 2544,84 2544,8055	Kr III Fe II O III Xe II Kr III F III Cs Si III Kr IV Fe I Ar II Al II Fe II Cl II Cu II	1 8 4 3 1 3 2 10 5 10 3 6 7 6 15 100	2539,58 2539,50 2539,4 2539,3576 2539,174 2539,08 2539,003 2538,997 2538,98 2538,94 2538,809 2538,67 2538,500 2538,34 2538,205 2538,02	F III O III Li II Fe I Cs II Cs II Fe II Fe II C II O IV Fe II Cs Fe II Xe II	00 2 2 7 5 10 10 8 2 3 9 2 5 6 3

2537,873 N II 3 2529,1361 Fe I 10 2537,673 N III 6 2529,080 Fe II 5 2537,40 N II 0 2528,8 Cs 8 2537,142 Fe II 5 2528,5086 SI 450 2536,86 Cu 2 2528,40 Xe II 6 2536,877 Cu 1 2 2528,8 Cs SI 450 2536,877 Cu 2 2528,40 Xe II 6 2536,877 Cu 2 2528,98 Ci III 5 2536,677 Cu 2 2528,98 Ci III 5 2536,073 Cu 2 2528,98 Ci III 5 2536,074 Cu 2 2522,980 Ci III 5 2536,075 Cu 2 2527,980 Ti 1 15 2536,086 Ti II 10 2527,980 Ti II 15 2533,686 Fe II 7 2528,08 Ci III 15 2533,588 Ti II 10 2527,762 N II 2 2533,588 Ar II 4 2527,762 N II 2 2533,580 Fe II 7 2527,458 Fe I 15 2533,580 Fe II 7 2527,165 Fe II 5 2533,480 Fe II 7 2527,165 Fe II 6 2534,640 Ti II 20 2526,98 Xe II 12 2534,410 Fe II 9 2526,98 Xe II 12 2534,40 Ar IV — 2526,99 Xe II 12 2534,40 Ar III 7 2527,03 OII 1 2534,40 Ar III 3 2526,477 AI II 1 2533,92 Ar III 3 2526,477 AI II 1 2533,344 Fe II 9 2536,91 OII 7 2533,44 Fe II 4 2526,17 Xe II 12 2533,44 Fe II 4 2526,17 Xe II 1 2533,44 Cs 2 2525,48 Cs Cs Cs 2533,31 Xe III 2 2525,48 Cs Cs Cs 2533,31 Xe III 2 2525,48 Cs Cs 2533,31 Xe III 2 2524,655 Ti II 3 2533,176 Ci III 5 2525,49 Ar II 4 2533,657 Fe II 10 2526,071 Fe II 5 2533,384 Fi I 10 2524,48 Cs II 2533,44 Cs 2 2525,48 Cs Cs Cs 2533,31 Xe III 2 2525,48 Cs Cs 2533,31 Xe III 2 2525,48 Cs Cs 2533,31 Xe III 2 2525,48 Cs Cs 2533,31 Xe III 2 2524,48 Cs II 2533,49 Ci II 5 2524,48 Cs II 2533,40 Ci II 5 2524,48 Cs II 2533,666 Fi II 2 2524,48 Cs II 2533,667 Fe II 10 2524,48 Cs II 2533,666 Fi II 2 2524,48 Cs II 2533,666 Fi II 2 2524,48 Cs II						
2537, 79	λ	Symbol	I	a	Symbol	I
2536,67	2537 ,57 2537 ,49 2537 ,16 2537 ,142 2536 ,86	Kr III N II Kr III Fe II Cu I	$egin{array}{c} 6 \\ 0 \\ 1 \\ 5 \\ 2 \end{array}$	2529,080 2528,8 2528,679 2528,5086 2528,49	Fe II Cs Ar II Si I Xe II	5 8 3 450 6
2536,018	2536 ,673 2536 ,67 2536 ,62	Fe II Cu I F IV	7 2 1	2528,318 2528,08 2528,08 2527,980	Cl III O IV Ti I	5 2 5
2535, 250	2536,018 2535,881 2535,758 2535,6086	Ar II Ti II Ar II Fe I	7 10 1 8	2527,762 2527,7 2527,4358 2527,16	N II C IV Fe I Kr II	2 1 15 3
2534 08	2535,250 2534,712 2534,640 2534,416	Ar II Ar II Ti II Fe II	$\begin{array}{c} 3\\7\\20\end{array}$	2527 ,102 2527 ,03 2526 ,98 2526 ,91	Fe II O II Xe II O II	6 1 12 7
2533,644 F III 40 2533,44 Cs 20 2533,44 Cs 20 2533,31 Xe III 2 2525,69 Ar IV 9 2533,16 Al II 1 2 2525,68 Cs 20 2532,655 Al II 2 2525,619 Ti II 30 2532,48 Cl III 5 2525,51 Kr III 2 2532,3814 Si I 110 2525,51 Kr III 2 2532,10 Al II 3 2525,479 Ar II 4 2531,76 Cl III 5 2525,387 Fe II 10 2531,76 Cl III 5 2525,387 Fe II 10 2531,78 Kr II 1 222252,022 Fe I 7 2531,78 Kr II 1 22224,97 Kr III 10 2531,548 Na II 6 2524,655 Ti II 8 2531,36 Xe II 3 2524,655 Ti II 8 2531,36 Xe II 3 2524,65 Kr IV 5 2531,36 Xe II 3 2524,6 A Cs II 0 2531,36 Xe II 3 2524,48 Nr II 4 2530,66 F III 20 2524,48 Nr II 4 2530,66 C IV 6 2524,48 Nr II 1 2530,423 Ar II 1 2530,423 Ar II 1 2530,423 Ar II 1 2530,423 Fe II 6 2524,41 C IV 9 2525,30,103 Fe II 6 2529,98 C IV 11 2529,567 Fe II 10 2522,3048 Cu II 50 2522,311 Fe I 5 2529,567 Fe II 10 2522,3048 Cu II 1 10 2522,505 Fe I 40 2522,505 Fe I 40	2534 ,08 2533 ,95 2533 ,92	O III Cl III Ar III	1 3	2526 ,5929 2526 ,477 2526 ,295	Cu II Al II Fe II	25 1 9
2532 ,48	2533 ,627 2533 ,44 2533 ,31	Fe II Cs Xe III	$\frac{10}{20}$	2526 ,076 2526 ,071 2525 ,69	Ar II Fe II Ar IV	2 5 9
2531,76 O IV 2 2 2525,022 Fe I 7 2531,73 Kr III 1 4 2524,97 Kr III 10 2531,548 Na II 6 2524,655 Ti II 8 2531,36 Kr III 1 20 2524,5 Kr IV 5 2531,266 Ti II 20 2524,488 N II 4 2530,66 F III 2 2524,488 N II 4 2530,66 C IV 6 2524,46 Xe II 3 2530,423 Ar II 4 2530,30 O II 8 2524,41 C IV 9 2524,2939 Fe I 8 2530,21 Na III 15 2524,27 Kr III 2 2524,409 Xe III 1 2 2529,98 C IV 11 2 2524,1079 Si I 425 2529,98 C IV 11 2 2523,66 Cs II 4 2529,96 Ti I 4 2529,866 Ti I 4 2529,866 Ti I 4 2529,866 Ti I 4 2529,547 Fe II 10 2529,545 Fe II 10 2529,546 Fe II 10 2529,546 O III 1 2529,360 O III 1 1 2529,360 O III 1 2529,360 O III 1 1 2522,8505 Fe I 40 2529,3048 Cu II 50 2522,55 Fi II 0	2532 ,48 2532 ,3814 2532 ,10	Cl III Si I Al II	$\begin{bmatrix} 5 \\ 110 \\ 3 \end{bmatrix}$	2525 ,51 2525 ,48 2525 ,479	Kr III N II Ar II	$\frac{2}{0}$
2531,266 Ti II 20 2524,488 N II 4 2530,66 F III 2 2524,488 N III 4 2530,6 C IV 6 2524,46 Xe II 3 2530,423 Ar II 4 2530,30 O II 8 2524,2939 Fe I 8 2524,2939 Fe I 8 2530,418 Xe II 2 2524,2939 Fe I 8 2530,418 Xe II 2 2524,1079 Si I 425 2530,403 Fe II 6 2524,09 Xe III 1 2 2529,98 C IV 41 2529,98 C IV 41 2529,97 Mg III 2 2523,66 Cs II 4 2529,547 Fe II 40 2529,547 Fe II 10 2529,545 Fe II 10 2529,546 O III 1 2529,366 O III 2529,366 O III 2529,366 O III 1 2529,366 O III 1 2529,366 O III 1 2529,366 O III 1 2529,545 Fe II 10 2523,09 O II 1 1 2529,545 Fe II 10 2523,09 O II 1 1 2529,366 O III 1 2529,366 O III 1 2529,565 Fe I 40 2523,09 O II 1 1 2529,366 O III 1 2529,367 Fe II 10 2523,309 O II 1 1 2529,368 Cu II 50 2522,55 Fe II 10 0	2531,76 2531,73 2531,548 2531,46	O IV Kr II Na II Kr III	2 1 6 1	2525 ,022 2524 ,97 2524 ,655	Fe I Kr III Ti II	7 10 8
2530,30 O II 8 2524,4I C IV 9 2524,2939 Fe I 8 2530,21 Na III 15 2524,27 Kr III 2 2530,18 Xe II 2 2524,1079 Si I 425 2529,98 C IV 11 2 2529,97 Mg III 2 2523,7 C IV 4 2529,97 Mg III 2 2523,66 Cs II 4 2529,866 Ti I 4 2529,547 Fe II 10 2529,545 Fe II 10 2522,8505 Fe II 10 2529,3048 Cu II 50 2522,55 Fe II 10 0	2531 ,266 2530 ,66 2530 ,6	Ti II F III C IV	20 2 6	2524 ,5 2524 ,488 2524 ,48	Kr IV N II Ar III	5 4 1
2529,97 Mg III 2 2523,7 C IV 4 2529,92 O IV 3 2523,66 Cs II 4 2529,866 Ti I 4 2523,658 Fe I 6 2529,547 Fe II 10 2523,20 O II 1 2529,545 Fe II 10 2529,52 Kr III 1 2523,11 Fe I 5 2529,36 O III 2523,09 O II 1 2529,360 O III 2522,8505 Fe I 40 2529,3048 Cu II 50 2522,5 F II 0	2530 ,30 2530 ,21 2530 ,18 2530 ,103	O II Na III Xe II Fe II	8 15 2 6	2524 ,2939 2524 ,27 2524 ,1079	Fe I Kr III Si I	$\begin{array}{c} 8\\2\\425\end{array}$
2529 ,52 Kr III 1 2523 ,1I Fe I 5 2529 ,36 O III 2522 ,8505 Fe I 40 2529 ,3048 Cu II 50 2522 ,5 F II 0	2529 ,97 2529 ,92 2529 ,866 2529 ,547	Mg III O IV Ti I Fe II	2 3 4 10	2523 ,67 2523 ,66 2523 ,658	F IV Cs II Fe I	3 4 6
	2529 ,52 2529 ,36 2529 ,3048	Kr III O III Cu II	1 50	2523,09 $2522,8505$	O II Fe I	1 40

λ	Symbol	I	λ	Symbol	I
2522,488 2522,458 2522,36 2522,227 2521,9197 2521,814 2521,590 2521,089 2520,8 2520,791 2520,64 2520,534 2520,32 2520,32 2520,222 2519,6305 2519,45 2519,45 2519,38 2519,29 2519,2023 2519,17 2519,17 2519,017 2518,95 2518,40 2518,26	Fe I N II Cu III N II Fe I Fe II F III Fe II Cs N II Al II Ti I Kr III N II Fe I Al I Cl III Kr IV Kr III Al I Cs II Xe II Ti I Cu II Ar IV Ar III	6 4 25 7 7 7 4 7 2 6 2 10 2 5 10 1 5 6 6 4 350 00 6 7 8 8 8 8 6 2 4	2514,29 2514,01 2513,305 2513,28 2513,15 2512,92 2512,513 2512,41 2512,363 2512,260 2512,210 2512,128 2512,128 2512,165 2511,739 2511,74 2511,74 2511,74 2511,74 2511,418 2511,418 2511,33 2511,22 2511,46 2510,92 2510,8362 2510,624	Xe II Cl II Al I Ar IV Al II Fe II Cl II Fe I Ar II Na I Na I Cs C II Kr III Fe II CI II Fe II Tr II Cl II Fe II Ch II Tr III	5 3 5 12 1 6 5 2 5 4 4 2 2 1 1 10 3 5 8 6 3 5 0 1 4 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
2518, 15 2518, 1029 2518, 02 2517, 97 2517, 95 2517, 659 2517, 506 2517, 448 2517, 40 2517, 28 2517, 120 2517, 07 2516, 791 2516, 27 2516, 12 2516, 1125 2516, 12 2515, 59 2515, 59 2515, 59 2515, 57 2515, 460 2515, 42 2515, 42 2515, 14 2515, 01 2514, 383 2514, 3161	Cl II Fe I Kr IV O II Kr II Fe I Si IV Ti II O IV Ar IV Fe II F III Kr IV Ar II F IV Xe II Cl II Cs II F III Ar II F IV Na II Kr III F IV Na II F IV Na II Kr III Kr III Kr III Kr III Kr III	4 12 5 6 8 8 7 2 7 5 6 3 4 6 00 12 500 20 3 10 4 4 2 2 10 3 1 2 7 3 7 5	2510,56 2510,52 2510,37 2510,2 2509,23 2509,422 2509,421 2508,91 2508,83 2508,548 2508,34 2507,899 2507,89 2507,333 2507,08 2507,08 2506,86 2506,86 2506,86 2506,69 2506,56 2506,56 2506,56 2506,56 2506,295 2506,295 2506,93 2504,70 2504,60	Kr II Xe III Na III Kr IV O IV Fe II C II Ar III Li II Ar II F IV Fe I Kr III O IV Ar II Kr III Kr III Ar III Fe I Xe II Kr III C IV Cs II Na II Cu II Fe I Ar II Fe I Ar II Kr III Kr III	3 20 2 8 5 10 3 1 0 6 1 7 3 1 25 8 5 5 5 3 1 2 3 7 5 3 3 5 3 5 3 5 3 5 3 5 3 5 3 5 3 5

λ	Symbol	I	λ	Symbol	I
2504,42 2504,25 2504,23 2504,20 2504,188 2503,935 2503,87 2503,87 2503,560 2503,35 2502,75 2502,75 2502,390 2502,2 2501,970 2501,84 2501,836 2501,66 2501,1332 2501,10 2501,04 2500,928 2500,919 2500,672	Ar III Al III Cl IIII O IV N II Ar II Fe II F IV Fe II Cl II Fe II Cs Si II O IV Ar II F IV Fe I F IV Fe I F IV Fe I F IV FI F IV FI F IV FI F IV	4 1 5 2 4 4 7 7 1 5 7 40 7 2 5 4 0 20 1 4 3 5 4	2494,71 2494,66 2494,114 2494,01 2493,999 2493,940 2493,75 2493,40 2493,261 2493,180 2493,16 2493,153 2492,95 2492,58 2492,2 2492,146 2492,013 2491,984 2491,78 2491,78 2491,37 2491,35	N II Kr II Kr III Fe I N II O IV Fe II Fe II N II O III Cu I Ar III Fe I Ar II Fe I Kr III Ke II Kr III	3 1 4 40 6 3 10 7 12 12 2 5 3 0 00 2000 3 8 5 3 6 2
2500,672 2500,64 2500,397 2499,96 2499,825 2499,527 2499,29 2498,95 2498,94 2498,895 2498,894 2498,77 2498,53 2497,85 2497,820 2497,72	N II Kr III Ar II Ar III N II Ar II O IV F IV Ti II Fe I Fe II Kr III Cl II Al II Fe II F II	4 8 5 1 2 4 6 0 2 10 10 3 3 30 2 7 2	2491,21 2491,1562 2491,036 2490,87 2490,856 2490,76 2490,733 2490,6454 2490,3 2490,281 2489,822 2489,751 2489,664 2489,5	N II Fe I Ar II C II Fe II Xe II Na I Fe I Cl III FE II Fe II Cu II Cs	3 20 4 2 6 20 3 30 5 4 8 15 5 2
2497,71 2497,67 2497,58 2497,221 2497,10 2497,05 2496,97 2496,93 2496,9 2496,83 2496,79	Kr.III Ca III Cu III Ar II O IV Na III N II Ar IV Cs N II F II	15 5 20 3 3 50 4 3 2 5	2489,39 2489,11 2489,0 2488,950 2488,86 2488,746 2488,74 2488,3 2488,1437 2488,120	Kr II Xe II O III Fe I Ar III N II Cs II O III Fe I N II	8 50 00 6 12 3 1 00 40 2
2496,5343 2496,40 2496,04 2495,920 2495,04 2494,92 2494,90 2494,89	Fe I Ar III Cl II Ar II Cs N II Ar III Cu I	6 5 20 2 20 0 6 10	2487,50 2487,356 2487,064 2487,03 2486,91 2486,906 2486,693 2486,69 2486,49	Kr II Fe II Fe I Kr III Cl III Ar II Fe I Xe III N III	3 5 12 1 5 3 10 3 3

2486, 371 Fe I	λ	Symbol	I	λ	Symbol	I
2495, 93	2486 ,345 2485 ,985 2485 ,79	Fe II Fe I F IV	7 10 0	2478,556 2478,37 2478,05 2477,69	C I Kr III F IV N IV	$\begin{array}{c} 16\\2\\1\\8\end{array}$
2484 87	2485 ,42 2485 ,378 2485 ,35	Cs Si IV Al II	20 1 1	2477 ,29 2477 ,21 2476 ,970	Cl III Ti II Ar II Ar III	2 2 2 6
2484,243 Fe II	2484 ,87 2484 ,56 2484 ,360	Ar III N III F III	2 4 9	$\begin{array}{c} 2476,10 \\ 2476,07 \\ 2475,89 \\ 2475,73 \end{array}$	Ar III Cs II Xe II O III	7 10 100 00
2483,531 Fe I 10 2474,8151 Fe I 8 2483,43 Xe III 1 1 2474,765 Fe II 6 2483,2718 Fe I 60 2474,69 Kr III 2 2483,225 Ar II 2 2474,69 Kr II 2 2483,025 Ar II 2 2474,252 Ar II 1 2483,0 Cs 2 2474,06 Kr IV 5 2482,99 Kr III 2 2482,85 N III 1 1 2473,998 Ar II 4 2482,816 Si IV 2 2473,996 Kr III 4 2482,654 Fe II 8 2473,398 Kr III 10 2482,654 Fe II 8 2473,3339 Cu II 20 2482,34 Cu III 30 2473,3339 Cu II 20 2482,34 Cu III 30 2473,3314 Fe II 6 2482,151 Ar II 4 2472,95 Al III 1 2481,77 Cl III 2 2472,95 Al III 1 2481,77 Cl III 2 2472,95 Al III 1 2481,77 Cl III 2 2472,95 Al II 1 1 2481,77 Cl III 2 2472,95 Al II 1 1 2481,77 Cl III 2 2472,95 Fe I 12 2481,478 Ar II 5 2472,969 Cl II 3 2481,478 Ar II 5 2472,969 Cl II 3 2481,478 Ar II 6 2472,52 Ca III 1 2480,861 C III 4 2472,52 Ca III 1 2480,861 C III 4 2472,52 Ca III 1 2480,861 C III 4 2472,426 Fe II 5 2480,858 Ar II 6 2472,426 Fe II 5 2480,858 Ar II 6 2472,426 Fe II 5 2480,858 Ar II 6 2472,426 Fe II 5 2480,850 C C III 4 2472,426 Fe II 5 2480,858 Ar II 6 2472,426 Fe II 5 2480,858 Ar II 6 2472,426 Fe II 5 2480,73 O III 1 2472,426 Fe II 5 2480,73 O III 1 2472,426 Fe II 5 2480,73 O III 1 2472,426 Fe II 5 2480,467 Ar II 3 2471,488 Cs II 1 2480,71 Cs II 6 2471,07 Cl III 5 2480,41 Cs II 6 2471,07 Cl III 5 2480,458 Fe II 8 2470,987 Ti I 3 2479,7774 Fe I 20 2470,658 Fe II 7	2484 ,243 2484 ,187 2484 ,11 2484 ,06	Fe II Fe l Ar III F IV	5 15 6 1	2475,31 2475,260 2475,057 2474,90	F IV Al II Li I Kr III	0 4 4 3
2483,196 Si III 6 2474,252 Ar II 1 2483,0 Cs 2 2474,22 Ti II 2 2482,99 Kr III 2 2474,06 Kr IV 5 2482,85 N III 4 2473,998 Ar II 4 2482,86 Si IV 2 2473,996 Kr III 4 2482,66 O III 0 2473,339 Cu II 20 2482,34 Cu III 30 2473,314 Fe II 6 2482,151 Ar II 4 2472,95 Ar III 8 2481,77 Cl III 2 2472,909 Fe I 12 2481,508 Si III 3 2472,909 Fe I 12 2481,478 Ar II 5 2472,909 Fe I 12 2481,04 Kr III 4 2472,52 Ca III 4 2480,858 Ar II 6 2472,34 Xe III 5 2480,73 O III 1 2471,92 Ar III 6 2480,467	2483 ,531 2483 ,43 2483 ,2718 2483 ,24	Fe I Xe III Fe I O III	10 1 60 0	2474 ,8151 2474 ,765 2474 ,69	Fe I Fe II Na III	$\begin{matrix} 8 \\ 6 \end{matrix}$
2482,654 Fe II 8 2473,40 Ne III 10 2482,60 O III 0 2473,3339 Cu II 20 2482,34 Cu III 30 2473,314 Fe II 6 2482,151 Ar II 4 2472,95 Ar III 8 2481,57 Cl III 2 2472,909 Fe I 12 2481,508 Si III 3 2472,8962 Fe I 5 2481,478 Ar II 5 2472,69 Cl II 3 2481,04 Kr III 1 2472,52 Ca III 1 2480,861 C III 4 2472,426 Fe II 5 2480,858 Ar II 6 2472,34 Xe III 1 2480,73 O III 1 2471,92 Ar III 6 2480,70 Cs 2 2471,88 Cs II 1 2480,467 Ar II 3 2471,28 Xe III 3 2480,41 Cs II 6 2471,07 Cl III 5 2480,41	2483 ,196 2483 ,0 2482 ,99 2482 ,85	Si III Cs Kr III N III	6 2 2 1	2474,252 2474,22 2474,06 2473,998	Ar II Ti II Kr IV Ar II	2 5 4
2481,77 Cl III 2 2472,909 Fe I 12 2481,508 Si III 3 2472,8962 Fe I 5 2481,478 Ar II 5 2472,69 Cl II 3 2481,04 Kr III 1 2472,52 Ca III 1 2480,861 C III 4 2472,426 Fe II 5 2480,858 Ar II 6 2472,34 Xe III 1 2480,73 O III 1 2471,92 Ar III 6 2480,7 Cs 2 2471,88 Cs II 1 2480,502 C III 4 2471,28 Xe III 3 2480,467 Ar II 3 2471,28 Xe III 3 2480,41 Cs II 6 2471,07 Cl III 5 2480,158 Fe II 8 2470,987 Ti I 3 2470,774 Fe I 20 2470,658 Fe II 7	2482,654 2482,60 2482,34 2482,151	Fe II O III Cu III Ar II	8 0 30 4	2473 ,40 2473 ,3339 2473 ,314 2472 ,95	Ne III Cu II Fe II Ar III	10 20 6 8
2480,861 C III 4 2472,426 Fe II 5 2480,858 Ar II 6 2472,34 Xe III 1 2480,73 O III 1 2471,92 Ar III 6 2480,7 Cs 2 2471,88 Cs II 1 2480,502 C III 4 2471,28 Xe III 3 2480,467 Ar II 3 2471,28 Xe III 3 2480,41 Cs II 6 2471,07 Cl III 5 2480,158 Fe II 8 2470,987 Ti I 3 2470,774 Fe I 20 2470,658 Fe II 7	2481 ,77 2481 ,508 2481 ,478	Cl III Si III Ar II	$\begin{bmatrix} 2\\3\\5 \end{bmatrix}$	2472 ,909 2472 ,8962 2472 ,69	Fe I Fe I Cl II	12 5 3
2480,467 Ar II 3 2471,28	2480 ,861 2480 ,858 2480 ,73 2480 ,7	C III Ar II O III Cs	6 1 2	2472,426 2472,34 2471,92 2471,88	Fe II Xe III Ar III Cs II	5 1 6 1
	2480,467 2480,41 2480,158 2479,7774	Ar II Cs II Fe II Fe I	3 6 8 20	$2471,24 \\ 2471,07 \\ 2470,987$	N III Cl III Ti I	$\begin{array}{c} 00 \\ 5 \\ 3 \end{array}$
2479,77 F IV 0 2479,76 Ar III 3 2470,48 F III 3 2470,45 Kr II 10 2470,355 Ar II 3 2470,355 Ar II 3 2470,279 F III 7 2470,055 Ar II 5 2470,18 Xe II 5	2479 ,754 2479 ,4813	Cu I Fe I	10 6	2470,45 $2470,355$ $2470,279$	Kr II Ar II F III	10 3 7
2478,85 Kr II 3 2478,82 Xe II 4 2469,876 Ar II 2 2469,712 Fe II 8 2478,79 Ar III 6 2469,58 Cs II 0 2478,709 F III 6 2469,46 Xe II 5 2478,64 Ti II 5 2469,20 Cl III 5	2478 ,85 2478 ,82 2478 ,79 2478 ,709	Kr II Xe II Ar III F III	$egin{array}{c} 3 \\ 4 \\ 6 \\ 6 \end{array}$	2469 ,876 2469 ,712 2469 ,58 2469 ,46	Ar II Fe II Cs II Xe II	${0} \\ {5}$

λ	Symbol	I	λ	Symbol	I
2468,86 2468,5006 2468,50 2468,43 2468,43 2468,37 2468,36 2468,30 2468,20 2468,12 2467,732 2467,732 2467,10 2466,811 2466,8 2466,72 2466,670	Na III Cu II Mg III Xe II Kr III Cl III N III Ar III Cs II Fe II Ar IV Ar III Cs Cl II Fe II Cs Cl II	30 5 3 5 6 3 0 2 4 3 6 - 3 7 2 2 2 7	2459,63 2459,45 2459,40 2459,36 2459,26 2459,23 2458,964 2458,88 2458,88 2458,782 2458,05 2457,954 2457,8 2457,74 2457,72 2457,5980 2457,55	Kr III O IV Na III Cl II N III Cs Fe II Cu I Al II Fe II Al II Ar II O III Cu I Kr III Fe I	5 3 45 10 0 2 5 5 5 0,5 8 2 2 2 00 5 10 6 2
2466,60 2466,3 2466,24 2466,162 2466,162 2465,200 2465,150 2464,907 2464,834 2464,77 2464,62 2464,26 2464,007 2463,900	Xe II Cs N III F III F II Fe II Fe II F III Kr III Ar III FE II	2 2 1 4 4 7 6 7 8 100 5 4 7	2457,525 2457,32 2457,20 2456,92 2456,266 2456,07 2455,892 2455,81 2455,628 2455,628 2455,31 2455,235 2455,22	Ar II Cs II Al II F IV Ar II Kr II Fe II F III Cs Ar II Kr II Ar II Al II	1 1 1 5 2 6 10 0,5 8 1
2463,79 2463,728 2463,38 2463,280 2463,27 2463,04 2463,02 2462,998 2462,76 2462,6483 2462,56 2462,35 2462,33 2462,0	F IV Fe I Ne III Fe II Kr II N III Xe III Ar II Kr III Fe I N III Ne III Kr III Cs	2 6 2 6 2 00 1 2 3 10 1 6 2 2	2455,080 2455,04 2454,99 2454,706 2454,63 2454,567 2454,21 2454,21 2454,12 2453,935 2453,85 2453,747	Ar II Kr II O III Ne III Fe I Ar III Fe II Ar II O III Kr III Fe II N III Fe II	5 8 5 6 6 6 8 0 3 25 4
2461,857 2461,83 2461,33 2461,282 2461,270 2461,203 2460,93 2460,84 2460,635 2460,453 2459,953 2459,82 2459,74	Fe II N II F V Fe II N II Ar II Cu I Ne III Ar II Fe II Ar II Kr IV	8 0 1 8 6 1 5 1 2 5 4 4 6	2453,74 2453,47 2453,28 2452,743 2452,62 2452,59 2452,58 2452,30 2452,29 2452,1180 2452,070 2451,7 2451,58 2451,56	Kr III Al II Kr III Ar II Xe III Al II Al II Ar IV CI II Kr III Si I F III Kr IV F IV F III	1 1 8 2 3 0,5 4 10 10 70 7 4 4 4

		,	n		
λ	Symbol	I	λ	Symbol	I
2451 ,52 2450 ,63 2450 ,541 2450 ,44 2450 ,134 2450 ,06 2450 ,062 2449 ,590 2449 ,5 2449 ,484 2449 ,407 2449 ,38 2449 ,36 2449 ,179 2448 ,58 2448 ,21 2447 ,747 2447 ,747 2447 ,743 2447 ,743 2447 ,43 2447 ,43 2447 ,43 2447 ,43 2447 ,44 2446 ,462 2446 ,462 2446 ,462 2446 ,405 2446 ,355 2445 ,558	Kr III F V Ar II Ti II Fe II O IV O III Mg II F III Si III O IV Ar II CI III Cu II Ti II Fe II Ar IV Xe III Ar III Fe III	4 2 1 6 5 10 2 6 5 11 2 2 8 2 6 5 2 6 5 2 6 0 0 5 6 0 0 0 5 6 0 0 0 0 0 0 0 0 0 0	2441,622 2441,60 2441,288 2441,06 2440,976 2440,89 2440,49 2440,49 2440,05 2440,05 2440,05 2440,028 2439,860 2439,8 2439,78 2439,744 2439,69 2439,34 2439,300 2439,21 2438,83 2438,7674 2438,76 2438,47 2438,47 2438,174 2438,09 2437,632 2437,517 2437,200	F III Xe II Ar II O III Ti I Kr III Cl II Ti II Fe I Kr III Fe I Kr III Fe I Cl III Fe II Kr III Fe II Kr III Fe II Kr III O III Fe III Cu III Fe III Cu III Fe III Ar II Ar II	8 2 2 2 10 5 4 5 5 15 6 4 8 2 1 25 5 5 8 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5
2445,55 2445,34 2445,210 2445,114 2444,828 2444,512 2444,26 2444,12 2443,8728 2443,8728 2443,842 2443,842 2443,369 2443,3643 2443,32 2443,219 2443,219 2443,2 2442,794 2442,68 2442,67 2442,67 2442,67 2442,567 2442,54 2441,90 2441,67 2441,637	O II Cl II Fe I Fe II Ar II Fe II Xe II Fe II O II Cl II Fe I Fe II Ar III Si I Cu II Cs II Ar II Cs II Ar II Cs II I II Cu II Ti II Fe I Ca III Cl III Fe I Ca III Cl III Ne III Cu I	10 20 6 40 3 8 2 10 5 7 20 15 7 65 6 5 2 2 2 2 5 15 2 2 2 10 15 2 2 2 10 15 2 2 2 2 10 10 10 10 10 10 10 10 10 10 10 10 10	2437,1 2437,100 2436,987 2436,615 2436,48 2436,344 2436,1 2436,06 2435,62 2435,47 2435,1545 2435,1 2434,988 2434,96 2434,81 2434,733 2434,64 2434,733 2434,64 2434,24 2434,229 2434,13 2434,067 2434,052 2433,95 2433,62	Cs Fe II Fe II Xe III Fe I Cl III O II F IV Xe II Si I Cl III Fe II Fe II Fe II Fe II FE II TI FE II	2 5 10 20 5 10 5 2 6 300 2 25 2 7 5 1 7 2 2 20 6 5 3 15 3 15 3 15 3 15 3 16 3 17 4 17 5 18 5 18 5 18 5 18 5 18 5 18 5 18 5

	λ	Symbol	I	λ	Symbol	I	
	2433,538 2433,49 2433,26 2433,211 2432,90 2432,8 2432,74 2432,72 2432,71 2432,6 2432,267 2432,12 2431,69 2431,69 2431,66 2431,62 2431,08 2431,07 2431,08 2431,07 2431,08 2431,07 2431,08 2431,07 2431,08 2431,07 2431,08 2431,07 2431,08 2430,41 2430,46 2430,46 2430,41 2430,46 2429,65 2429,446 2429,35 2429,446 2429,35 2429,446 2429,35 2428,92 2428,93 2427,79 2427,65 2427,48 2426,94 2426,94 2426,94 2426,94 2426,94 2426,93 2425,93 2425,93 2425,93 2425,95 2425,95 2425,95 2425,95 2426,70 2426,94	O II C II C II C II C II C II Kr IV Kr II Xe II Cs II Cs II C II Ar II O III Ar II O III Fe I CI II Ar II C II Ar II C II Fe II C II	9 0 3 6 0 1 8 12 5 8 7 0 1 0 0 2 0 20 1 2 1 10 1 3 30 7 5 1 0 2 2 7 1 10 6 8 1 1 10 6 20 3 20 1 4 2 2 1 8 10 0 4 2 2 3 2 4 2 2 3 2 4 2 2 2 3 2 4 2 2 2 3 2 4 2 2 2 3 2 4 2 2 2 3 2 4 2 2 2 3 2 2 2 2	2424,27 2424,143 2424,01 2423,93 2423,528 2423,52 2423,42 2422,94 2422,91 2422,84 2422,84 2422,47 2422,44 2422,12 2422,48 2422,48 2422,12 2422,48 2421,502 2421,502 2421,4 2421,29 2421,65 2421,27 2421,2 2421,00 2420,457 2420,44 2420,19 2420,457 2420,44 2420,19 2420,06 2419,85 2419,5 2419,413 2419,36 2419,43 2419,5 2419,413 2419,36 2419,46 2418,82 2418,704 2418,60 2418,568 2418,46 2418,41 2418,362 2417,866 2417,214 2416,9 2416,73 2416,605 2416,05 2416,05 2416,05 2416,05 2416,05 2416,05 2416,00 2415,84 2415,197 2415,13	Ar III Ti I Fe II Cl II Ar III Ar III Si II Xe II Fe III Cl III Ar II Ar II Ar II Ar II Ar II Ar II Si II Ar II F III Si II Cs Ti I Xe II Ar II F III Ar II Ar II F III Ar II Ar II Cs Cl III Ar II Ar II Ar III Ar II Ar II Ar II Ar II Ar II Cu I Cu I Cl III Ar III	6 10 8 10 12 5 12 3 10 3 2 5 4 4 4 4 5 2 2 4 3 3 3 2 10 200 8 6 3 3 2 4 5 1 0 1 1 7 7 4 10 6 2 4 4 5 7 4 3 4 7 5 4	
709	2424 ,659 2424 ,49 2424 ,428	Ar II Ar III Cu II	4 2 50	2415 ,0 2414 ,94 2414 ,89	Cs Kr II Cs II	2 2 8	
/ U''							

λ	Symbol	I	λ	Symbol	I
2414,89 2414,84 2414,78 2414,77 2414,52 2414,52 2414,224 2414,18 2413,97 2413,81 2413,54 2413,486 2413,309 2413,20 2413,18 2412,94 2412,910 2412,73 2412,48 2412,461 2412,32 2412,48 2411,60 2411,58 2411,60 2411,58 2411,066 2411,01 2410,94 2410,85 2410,80 2410,72 2410,80 2410,72 2410,80 2410,72 2410,80 2410,72 2410,80 2410,72 2410,517 2410,34 2409,74 2409,702 2409,503 2409,766 2408,96 2408,96 2408,96 2408,96 2408,943 2408,52 2408,207 2407,862	Kr II Cu II Kr III Cs Xe III Ar II Cu II Ti III Kr II Ne III Fe II Ar II Ne III Ne III Ne III Ar II Cu III	10 5 12 1 5 15 10 10 3 6 1 9 10 8 12 11 15 10 4 15 4 4 10 10 10 10 10 10 10 10 10 10 10 10 10	2405,228 2405,19 2405,10 2405,01 2404,98 2404,882 2404,864 2404,59 2404,44 2404,430 2404,352 2404,28 2403,37 2403,3551 2403,3551 2403,32 2403,29 2403,237 2402,96 2402,450 2402,450 2402,450 2402,710 2402,75 2401,79 2401,761 2401,77 2401,58 2400,10 2399,851 2399,851 2399,851 2399,851 2399,237 2399,239 2399,237 2399,237 2399,237 2399,15 2398,98 2398,91 2398,76	Symbol Ar II Ne IV C IV F III Ar III Fe II Cu I Cl II Ar III Ne IV Cl II Xe III Kr III Fe III Cu II Cl III Kr III Fe III Cu II Cl III Kr III Fe II Cu II Cr III Kr III Fe II Cr II Kr III Fe II Cr II Kr III Fe II Cr II Kr III Cu II Kr III Kr III Cu II Kr III	1 5 1 6 4 6 9 2 5 3 5 7 9 0 3 1 3 6 100 5 1 5 2 1 3 2 9 9 1 2 1 3 2 9 1 2 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
2407,802 2407,49 2407,37 2407,20 2407,10 2406,90 2406,665	O II O II Ar IV Kr III Cl II Cs Cu I	6 1 6 10 5 2 1500	2398 ,76 2398 ,559 2398 ,372 2397 ,548 2397 ,29 2396 ,86	Al III Ca I Ar II Ar II F III	5 2 5 2 1
2406,658 2406,647 2406,58 2406,42 2406,41 2405,92 2405,776	Fe II Ar II Na III Kr IV O II Xe II Ar II	9 5 18 2 6 3 2	2396,04 2395,63 2395,625 2395,408 2395,150 2394,92 2394,73 2394,355 2394,33	Mg III Ar III Fe II Fe II Mg I Cs Cl III Li I O III	3 10 9 7 4 2 5 2 4
2405,49	Cu III	20	4074,00	0 111	793

λ	Symbol	I	a .	Symbol	I
2394,051 2393,99 2393,94 2393,835 2393,6 2393,20 2392,86 2392,78 2392,627 2392,45 2391,73 2391,35 2390,878 2390,878 2390,866 2390,755 2390,50 2390,50 2390,44 2390,02 2389,9732 2389,533 2389,98 2388,627 2388,268 2388,268 2388,267 2388,268 2388,268 2388,268 2388,75 2387,90 2387,75 2387,3 2387,90 2387,75 2387,36 2387,90 2387,90 2387,75 2387,36 2387,90 2387,90 2387,90 2387,90 2387,90 2387,90 2387,90 2387,93 2387,90 2387,90 2387,90 2387,93 2387,90 2387,93 2387,90 2387,90 2387,90 2387,93 2387,90 2387,90 2387,90 2388,494 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969 2384,969	Na II Cu II Kr III Al II Cs Cu II Ca III Cs II Kr II Cu I Xe II Xe II Al II Cu III Al II Ar II N II Al II Kr II O III Kr II O III Kr II Cu III Ar II Cl III Cs Na II Ar II Ar II Ar II Cu III Cu III Cu III Cu III Ar II	2 2 40 2 2 2 3 15 10 2500 2 4 10 1 2 4 2 4 8 4 25 8 1 9 1 3 1 3 3 3 1 1 3 1 3 1 1 1 3 1 1 1 1	2380,80 2380,759 2380,15 2379,863 2379,54 2379,47 2379,39 2379,275 2378,90 2378,395 2378,395 2376,69 2376,69 2376,430 2376,29 2375,82 2375,73 2375,52 2375,08 2375,02 2374,5192 2374,59 2374,5192 2374,496 2374,496 2374,255 2374,496 2373,354 2373,354 2373,41 2373,354 2373,421 2372,46 2372,46 2372,46 2372,16 2372,070 2371,718	Ti Fe II Cs Ar II Cs Cl III Cu II Fe II O III Cu II Ti I Cu II Ti I Cs II Kr III Fe II Ar II Cu II Fe II Ar II Cu II Cs O II Kr II Fe II Ti III Fe II Ti II Ti I Fe II Ti III Ti I Fe II Ti III Ti II	477332537407230151502407463104548208 12597 20237 104
2384 ,516 2384 ,386 2384 ,20 2383 ,934 2383 ,92	Ti I Fe II Ne IV Ar II O III	$\begin{array}{c} 4 \\ 7 \\ 3 \\ 2 \\ 6 \end{array}$	2371,662 2371,4313 2370,985 2370,7474	Ar II Fe I Si IV Cu II	$\begin{array}{c} 1\\45\\3\\20\end{array}$
2383 ,486 2383 ,26 2383 ,242 2382 ,955 2382 ,32	Ar II Li II Fe II Ar II O III	6 2 7 4 7	2370,726 2370,496 2370,49 2370,37 2370,225	Al I Fe II N III Cl III Al I	6 5 3 6
2382,039 2381,99 2381,138	Fe II F III Ar II	9 2 3	2369,960 2369,916 2369,8897 2369,62	Fe II Ar II Cu II Xe II	5 2 100 4

λ	Symbol	I	λ	Symbol	I
2369 ,4567 2369 ,304 2369 ,187 2368 ,94 2368 ,75 2368 ,68	Fe I Al I Ar II Kr II Cs II Xe II	8 10 2 3 0 5	2360 ,20 2360 ,14 2360 ,058 2359 ,997 2359 ,67 2359 ,5I	Si II Kr III Ar II Fe II Cl III Ti IV	10 3 4 8 6 5 2
2368 ,612 2368 ,595 2368 ,19 2368 ,15 2368 ,15 2368 ,112 2367 ,611	Ar II Fe II Kr III Cu III Ar IV Al I Al I	1 7 4 20 3 8 8	2359,23 2359,111 2359,11 2359,104 2358,917 2358,70	Cs Fe II Ti IV Fe II Li I K II	8 5 8 1 1
2367 ,43 2367 ,33 2367 ,248 2367 ,2 2367 ,053	N III Na III Ar II F III Al I	4 4 1 1 6	2358,5 2358,48 2358,408 2357,97 2357,96 2357,9	Kr IV Kr III Ar II Si II Ne IV Cs	3 3 2 50 10 2
2367,02 2366,972 2366,778 2366,755 2366,595 2366,053	Ne Si II Ar II Si IV Fe II Si II	5 2 2 5 5	2357,85 2357,82 2357,589 2357,18 2356,95	Cs II Ti II Ar II Si II Cs II	2 5 2 5 30
2365 ,77 2365 ,52 2365 ,49 2365 ,49 2365 ,15	Ne Kr II Al II Ne IV O II	6 3 1,5 4	2356, 90 2356, 72 2356, 6410 2356, 295 2356, 425	N II Xe II Cu II Si II Xe II	$egin{array}{c} 0 \\ 4 \\ 10 \\ 100 \\ 1 \\ 2 \\ \end{array}$
2365,03 2364,827 2364,826 2364,81 2364,70 2364,33	O II Cs Fe II Cs II Kr III Si II	1 2 8 10 1 3	2356, 12 2355, 17 2355, 0141 2354, 889 2354, 793 2354, 466	Cs Ti II Cu II Fe II Ar II Fe II	2 15 5 1
2364,15 2364,112 2364,04 2363,51 2363,28	Cu II Ar II N II Fe III Ne IV	3 5 0 7 6	2354,44 2354,42 2354,135 2354,12	Cs II Cs Ar II Ti II	10 2 6 3 2
2363 ,26 2363 ,220 2363 ,21 2362 ,866 2362 ,85	Kr III Cu I Cu III Ar II Ne	3 5 8 1 5	2353,96 2353,68 2353,52 2353,426 2353,09	Cu II Kr II Xe II Ar II Si II	50 1 3 20
2362 ,74 2362 ,68 2362 ,68 2362 ,50 2362 ,083	Kr II Cu II Ne IV Xe II Ar II	6 2 6 1	2352 ,86 2352 ,731 2352 ,52 2352 ,33 2351 ,911	Kr II Ar II Ne IV Ar III Cs	2 2 8 5 2
2362,009 2361,82 2361,56 2361,19 2360,59	Fe II Kr III Cu III Cu II Si II	6 4 10 3 5	2351 ,8 2351 ,74 2351 ,67 2351 ,56 2351 ,40	Ar IV Cs Ar III Xe II Ca III	
2360 ,4 2360 ,293 2360 ,26	Kr IV Fe II Ar III	2 8 9	2351 ,198 2351 ,18 2350 ,84 2350 ,67	Fe II Xe II Ne IV Ti II	5 4 6 2

λ		Symbol	I	λ	Symbol	I	
2350 2350 2348 2348 2348 2348 2348 2348 2347 2347 2347 2346 2346 2345 2345 2345 2345 2345 2344 2344 2344	3,352 3,303 3,27 3,099 7,7 3,46 3,78 3,78 3,78 3,78 3,78 3,77 3,88 3,278 3,47 3,38 3,278 3,47 3,38 3,278 3,47 3,38 3,278 3,47 3,38 3,278 3,47 3,38 3,278 3,47 3,38 3,278 3,47 3,38 3,79 3,7	Ar II Fe I Al II Si II Ti II Si II Cu II Cu II Cu II Cu II Cu II Ti II Ti III Ti III Ar III Fe II Ar III Fe II Ar III Fe II Fe II Fe II Fe II Cu II Fe II Fe II Fe II Fe II Fe II Fe II Cu II Fe II Fe II Cu II C	55 420 3 10 1 4 15 2 8 4 8 2 2,5 2 6 2 40 1,5 6 5 5 7 5 9 12 4 10 8 6 10 6 3 8 8 3 3 3 3 2 5 6 2 2 4 3 3 2 5 4 3 6 3 6 3 6 3 3 3 3 3 3 3 3 3 3 3 3 3	2335,90 2335,42 2334,99 2334,606 2334,54 2334,33 2334,12 2333,78 2333,036 2332,895 2332,42 2331,67 2331,452 2331,35 2331,366 2331,16 2330,0 2329,931 2329,931 2329,931 2329,93 2329,93 2329,93 2329,93 2329,357 2329,357 2329,357 2329,357 2327,784 2327,784 2327,784 2327,784 2327,28 2327,48 2327,28 2324,85 2324,358	Cs II C IV Xe II F II Si II Ti III F II F II Ar II Ar II Ar II Te II Cs Ti III F II Ar II Ti III F II Ar II F II F II Ar II F II	00 2 2,5 30 3 30 3 1 22 1 8 8 8 3 8 3 7 0 1 2 0 3 1 3 3 0 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 0 3 1 3 1	
2337, 2336, 2336, 2336, 2336,	,768 ,75 ,45	Ar II Fe III Kr IV Cl III Cu II	6 10 4 5 20	2322,081 2322,00 2321,71 2321,650 2321,562	Ar II Cl II Fe III N II Al I	2 1 10 4 9	
706	•			2021,002	AI I	ìт.	

	,		11		
λ	Symbol	I	λ	Symbol	I
2321 ,28 2321 ,1 2321 ,07 2320 ,3585	Cl II Cs Cs II Fe I	1 6 10 40	2312,31 2312,29 2312,13 2312,00	Cu III Xe III N II Kr II	5 1 0 6
2320 ,33 2320 ,28 2320 ,25 2319 ,941	N III Cu III Cl II N II	00 8 2 4	2311 ,83 2311 ,58 2311 ,16	F IV O III Cs II	3 2 0
2319 ,70 2319 ,68 2319 ,561	Xe II O II Cu I	7 4 500	2311, 035 2310,87 2309,96 2309,860	Al I Ca III Na III Ar II	$\begin{array}{c} 4 \\ 0 \\ 30 \\ 2 \end{array}$
2319,52 2319,466 2319,37 2319,220 2319,13 2319,057	O III Fe III Ar III Fe III Ar III Al I	2 8 10 10 10	2309,53 2309,51 2309,148 2308,9999 2308,70 2308,191	N II Cu II Ar II Fe I O III Si III	1 6 6 30 1 10
2318,83 2318,35 2318,09 2318,04 2317,87 2317,745	Mg III Ar III N IV Ar III Kr III Ar II	1 2 6 12 1 5	2307 ,72 2307 ,71 2307 ,456 2307 ,28 2307 ,27	O II Cs II Ar II Xe II Ne	1 5 2 3 2
2317,482 2317,47 2317,37 2317,35 2317,046 2317,00	Al I Ar III O III N III N II Ar III	7 15 3 0 8 9	2307 ,266 2306 ,61 2306 ,42 2306 ,31 2306 ,22	Ar II Ne Si III Ne V He II	2 6 2 2 20
2316 ,80 2316 ,79 2316 ,690 2316 ,493	Xe II O II N II N II	10 3 6 7	2305 ,859 2305 ,665 2305 ,50 2304 ,87 2304 ,627	Ar II Ti I Ne Ne Fe I	2 12 2 4 5
2316 ,32 2316 ,299 2316 ,12 2315 ,70	Kr II Ar II O II Fe III	10 8 3 10	2304,60 2303,94 2303,73 2303,5815	Xe II Ne Xe III Fe I	1 3 1 20
2315 ,68 2315 ,65 2315 ,52 2315 ,52	Cs II Na II Kr II O III	6 0 8 4	2303,416 2303,416 2303,0585	Fe I Cu I Si I	15 1000 55
2315 ,39 2315 ,306 2315 ,25 2315 ,10	F VI Ar II N II Cu III	9 3 0 4	2303,012 2303,00 2302,92	Fe III Kr III Ar III	7 2 6
2314 ,983 2314 ,970 2314 ,76 2314 ,66	Al I Ar II O III Na III	4 6 2 3	2302 ,83 2302 ,808 2302 ,730 2302 ,67 2302 ,17	O II Fe III Ti I Kr II Ar III	5 8 10 3 15
2314 ,56 2314 ,24 2313 ,77 2313 ,720	N III Kr II Al II Ar II	1 6 1 7	2302,077 2301,825 2301,73 2301,6849	Ar II Ar II Kr II Fe I	$egin{array}{c} 4 \\ 3 \\ 6 \\ 20 \\ 6 \end{array}$
2313 ,70 2313 ,526 2313 ,1048	Xe II Al I Fe I	5 6 40	2301 ,173 2300 ,930 2300 ,85	Fe I Si III Ar III Kr II	8 10 6
2313 ,05 2312 ,491 2312 ,47	O II Al I Cs II	3 5 0	2300 ,38 2300 ,38 2300 ,35	Kr II Ne O II	2 8

	λ	Symbol	I	λ	Symbol	I	
	2300,179 2300,139 2299,98 2299,852 2299,72 2299,47 2299,47 2299,36 2299,2209 2299,15 2298,662 2298,51 2298,36 2298,36 2298,31 2298,36 2298,1699 2297,879 2297,82 2297,7877 2297,15 2297,14 2296,9279 2296,873 2296,870 2296,64 2296,52 2296,64 2296,52 2296,52 2296,5401 2295,859 2295,476 2295,401 2295,349 2294,91 2294,57 2294,406 2294,3683 2294,200 2294,17 2294,05 2293,8482 2293,842	Symbol Ar II Fe I Xe II Ti I Ar IV Al III Cu II Xe II Fe I Kr III Ne Fe I Cl III Al III F IV Fe I Ar II F IV Fe I Ar III K II Na III F III K II Na III F III	5 30 6 40 4 3 7 2 25 3 1 6 5 0 3 5 10 2 2 2 35 4 15 40 16 4 15 6 10 16 16 15 10 16 16 16 16 16 16 16 16 16 16 16 16 16	2291,38 2291,28 2291,26 2291,120 2291,034 2290,998 2290,88 2290,84 2290,545 2290,52 2290,425 2290,425 2290,425 2299,36 2289,36 2289,36 2289,31 2289,36 2289,31 2289,31 2288,82 2288,765 2288,444 2288,36 2288,444 2288,36 2288,47 2288,12 2287,79 2287,630 2287,2505 2287,21 2287,041 2286,69	Cl II Kr III Kr III Kr IV Fe I Si I Cu II O II Xe II Ar III Fe I Kr III Ar II N II Ar II Si I Ar II Ne VI Ar III Fe I Ar III Fe I Ar III O III O III Cl II O III Cl II O III Si IV Ar II Fe I Fe I O III Si IV Ar II Fe I Fe I O III Cl III III	4 3 6 15 35 15 6 2 6 9 1 3 3 0 5 20 2 1 4 10 2 4 5 00 2 7 00 30 15 30 15 4 16 5 5 6 7 8 9 16 16 16 16 16 16 16 16 16 16	
	2293,745 2293,49 2293,32 2293,318 2293,14 2293,056 2293,03	Ne IV O II N II Ne IV Fe III Ar III	6 6 4 2 10 12	2285,79 2285,72 2285,66 2285,612 2285,52 2285,24	Ne IV Na III O III Ar II Al II Xe II	9 35 2 1 2 2	
	2293,03 2292,652 2292,5249 2292,40 2292,39 2292,25			2285,22 2285,47 2285,07 2284,89 2284,60	F IV Al II O III O II Cs	2 3 00 3 2	
700	2292 ,130 2291 ,850 2291 ,81 2291 ,652	Ar II Fe III Cl III N II	6 4 4	2284,0864 2283,994 2283,93 2283,753 2283,6557	Fe I Ar II Cl III Ar II Fe I	40 7 7 I 12	

λ	Symbol	I	λ	Symbol	I
2283,652 2283,42 2283,3045 2283,243 2283,079 2283,07 2282,621 2282,61 2282,21 2281,50 2281,52 2280,85 2280,72 2280,222 2280,02 2279,964 2279,96 2279,96 2279,96 2279,47 2279,45 2279,45 2279,46 2279,47 2279,45 2279,47 2279,45 2279,46 2279,47 2279,45 2279,47 2279,45 2279,46 2279,47 2279,45 2279,46 2279,47 2279,45 2279,46 2279,47 2279,45 2279,46 2279,47 2279,45 2279,46 2279,47 2279,46 2279,47 2279,46 2279,40 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,672 2277,820 2277,820 2277,820 2277,820 2277,820 2277,820 2277,872 2275,838 2276,54 2276,2582 2276,54 2276,554 2276,954 2275,054 2274,923	N II O II Fe I Ar II Fe I Kr II Ar II Ne V Ar III Ar III Cs II Ar III F IV Fe I Cs II Ti I Cs II Fe I Na III Ar III Ar III F II Ar III Ar III Ar III F II Ar III Fe I I Cu III I Cu III I Cu III I Cu III I I I I I I I I I I I I I I I I I	4 3 9 7 9 30 8 1 7 1 00 7 5 0 8 2 12 2 10 3 4 4 3 2 3 10 40 6 5 7 10 2 8 12 4 10 4 10 4 10 10 10 10 10 10 10 10 10 10 10 10 10	2273,58 2273,51 2273,280 2273,24 2272,816 2272,8 2272,79 2272,76 2272,640 2272,613 2272,55 2272,42 2272,0703 2271,97 2271,79 2271,778 2271,778 2271,778 2270,91 2270,8628 2270,43 2270,20 2269,70 2269,36 2269,30 2269,70 2269,36 2269,30 2269,70 2269,36 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2269,70 2267,42 2267,98 2267,96 2267,77 2267,61 2267,466 2267,42 2267,29 2267,28 2267,411 2267,080 2266,98 2266,903 2266,903 2266,903 2266,903 2266,441 2266,16	Ne N III Ti I Kr II Fe I Cl III Cs Cs II Ar II Ti I Kr II N III Fe I F IV N III Fe I Cu III C II C II C II C II C II Ti II Ti II Fe I Al I Ti II Ti II Ti II Ti II Fe I Al I CI III C II Ti I T	20 1 8 8 8 8 1 2 0 2 8 1 0 1 3 1 4 0 1 3 1 4 1 4 8 0 2 1 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1
2274,923 2274,74 2274,54 2274,12 2274,088 2274,00 2273,98	Cu II Ne V N III Fe I Fe III Cs II	3 0 0 9 8 0	2266 ,08 2266 ,014 2265 ,94 2265 ,87 2265 ,71 2265 ,62	Cl III Al I Xe II N III Ne V Xe II Cu II	2 3 2 0 6 3 7
2273 ,83 2273 ,76 2273 ,65	Cs II Kr III F IV	$\begin{array}{c} 20 \\ 3 \\ 2 \end{array}$	2265,36 2265,215 2265,0546 2265,04	Ar II Fe I K II	4 20 5

	λ	Symbol	I	λ	Symbol	I
22 22 22 22 22 22 22 22 22	64 ,91 64 ,55 64 ,54 64 ,390 64 ,20 64 ,11 64 ,020 63 ,780 63 ,738	Ne III Cu II Ne IV Fe I Xe II Ne III Ti I Cu II	10 2 4 45 2 3 5 35 1	2254,283 2254,066 2253,26 2253,22 2253,16 2253,07 2253,00 2252,90 2252,72	Ar II Fe II Ti II Ne VI Cl II Cl III Cu II O II F V	5 8 2 3 30 7 2 3
22 22 22 22 22 22 22 22 22	63,474 63,463 63,39 63,212 63,21 63,079 63,068 62,95 62,80 62,632	Fe I Al I Ne V Cu II Ne III Cu I Ar II Xe II O II Ar II	6 7 3 8 12 2200 2 2 1 2	2252,71 2252,65 2252,54 2252,248 2251,8749 2251,84 2251,831 2251,50 2251,44	He II Ca III Kr IV Ar II Fe I Cu II Fe II Cl II Na III	10 2 2 6 12 2 80 40 45
22 22 22 22 22 22 22 22 22	62,16 62,08 61,592 61,23 60,547 60,528 59,76 59,66 59,587	Ne III Ne IV Fe III Ti II Fe III Cu I Kr III O II Si I	2 5 12 3 7 1300 6 2	2251,403 2251,17 2250,96 2250,7911 2250,32 2250,09 2250,00 2249,86 2249,658	Ar II Na III Cl II Fe I Kr II Ti II O II Xe II Ar II	2 20 20 10 8 2 1 4 1
22 22 22 22 22 22 22	59 ,57 59 ,5109 59 ,42 59 ,22 58 ,35 58 ,342 58 ,02 58 ,008 57 ,965	Ne V Fe I Kr IV Xe II Cs II Ar II Ne IV Al I Ar II	3 15 1 1 5 1 6 1	2249 ,347 2249 ,181 2249 ,175 2249 ,063 2248 ,960 2248 ,88 2248 ,857 2248 ,80 2248 ,73	Ar II Fe II Fe II Fe II Cu II N III Fe I Cs II Ar III	3 25 10 30 25 25 25 25 0 7
22 22 22 22 22 22 22 22	57,82 57,788 57,788 57,406 56,897 56,79 56,56 56,545 56,33	Cs II Fe II Fe III Fe III C II Xe II Ar II Ca III	12 25 8 10 0 1 3	2247,92 2247,76 2247,692 2247,65 2247,503 2247,002 2246,66	N III Ne VI Fe II N III Cu I Cu II Na III	6 1 35 2 2 75 40
22 22 22 22 22 22 22 22	56,19 56,10 56,05 55,859 55,691 55,68 55,64 55,408 55,29	C II Cs Ne V Fe I Fe II C II Cl III Ar II K II	2 3 1 45 50 1 2 3 3	$\begin{array}{c} 2246,56 \\ 2245,975 \\ 2245,6536 \\ 2245,505 \\ \\ 2245,48 \\ 2245,410 \\ 2245,39 \\ 2245,116 \\ 2244,690 \\ \end{array}$	Cs Ar II Fe I Fe II Ne V Ar II Kr II Ar II Ti I	2 3 15 45 3 2 10 2 7
22 22 22	55 ,23 55 ,478 54 ,975 54 ,58	C II Ar II Cu II Cs II	0 1 6 45	2244,31 2244,265 2244,216 2244,17 2244,080	Ca III Cu I Fe II Na III Ar II	2 2300 8 3 1

λ	Symbol	I	λ	Symbol	I
2243,662 2243,405 2243,10 2243,05 2243,0	Ar II Fe III Cu II Al II K II	5 8 6 4 2	2231,571 2231,512 2231,423 2231,2138	Cu II Fe II Ar II Fe I	30 10 5 15
2242 ,6183 2242 ,579 2242 ,29 2242 ,14 2242 ,10	Cu II Fe I Ar III Cu II C II	50 15 6 6	2231,16 2231,024 2230,948 2230,79 2230,69	Cl III Ar II Cu II Xe II Kr III	3 1 30 1 1
2242,16 2242,05 2241,86 2241,858 2241,54 2241,426	Cs II Xe II Ar II Fe III Fe II	2 2 2 12 20	2230,492 2230,40 2230,317 2230,30 2230,244	Ti I Cu II Ar II Na III Ti I	7 10 3 50 4
2241,425 2241,05 2241,028 2240,89 2239,906 2239,89	C II Ar II K Ar II O II	1 6 4 1 0	2230,087 2230,084 2229,850 2229,67 2229,66	Cu II Cu I Cu II Ti I O II	30 2500 30 7 0 8
2239 ,43 2239 ,10 2239 ,047 2238 ,974 2238 ,750	Na III O III Fe II N II Ti I	45 2 25 4 8	2229,648 2229,56 2229,267 2229,18 2229,12	Ar II Na III Fe III F V Cs	15 10 1 5 5
2238,454 2238,20 2238,155 2237,82 2237,721	Cu I Ti I Fe III Ti III Ar II	1100 6 10 1 2	2229,0735 2228,88 2228,8700 2228,761 2228,1722	Fe I Cs II Cu II Fe II Fe I	10 40 30 10
2237,577 2237,385 2237,34 2237,34 2237,21	Fe II Ar II Kr IV Cu I N III	20 1 3 5	2228,15 2227,92 2227,848 2227,775 2227,42	O III Kr II Fe III Cu I Ne V	3 30 7 1600 3
2237, 15 2236, 527 2236, 29 2236, 278 2235, 908	Kr II Ar II Ne V Cu I Fe III	4 3 2 900 10	2227,298 2227,14 2227,01 2226,,798 2226,773	Ar II Ti II Cs II Ti I Cu II	5 2 00 6 40
2235,904 2235,760 2235,699 2235,35 2235,208	Ar II Ar II Fe III Xe III N II	2 3 6 1 4	2226,19 2225,90 2225,697 2225,662	Na III Na III Cu I Ar II	8 45 2100 6
2234 ,673 2234 ,57 2233 ,809 2233 ,654	Ar II Cs II Ti I Fe III	6 0 8 6 4	2225,29 2225,11 2224,701 2224,550 2224,12	Na III Ti I Cu II Ar II Ne V	12 8 15 1
2233 ,478 2233 ,28 2232 ,690 2232 ,548 2232 ,430	Ar II Cs Fe III Fe III	3 10 8 10	2223,199 2222,79 2222,763 2222,066	Ti I Na III Fe l Ar II Si III	7 0 7 3
2232 ,44 2232 ,35 2232 ,17 2231 ,65	Ne V Kr III Na III N III	4 1 40 —	2222 ,01 2221 ,830 2221 ,65 2221 ,352 2220 ,81	Fe III Cu II Ar II Ne IV	10 2 1 1

λ	Symbol	I	λ	Symbol	I
2220 ,51	Cs II	9	2210,6894	Fe I	9
2220 ,453	Fe II	6	2210,53	K II	4
2220 ,388	Fe II	25	2210,321	Ar II	2
2220 ,347	Ar II	2	2210,2684	Cu II	60
2219 ,962	Ar II	6	2210,073	Fe III	6
2219 ,889	Fe II	20	2210,060	Al I	2
2219 ,87	Ca III	1	2209,795	Cu II	30
2219 ,75	Ti I	5	2209,66	Al III	1
2219 ,22	Ca III	2	2209,61	Cs	3
2219 ,14	Kr III	1	2209,35	Ne III	10
2218,9148	Si I	50	2209,049	Fe II	20
2218,805	Ar II	4	2208,85	Fe III	10
2218,70	O II	2	2108,611	Ca II	20
2218,504	Cu II	25	2208,419	Fe II	30
2218,41	N II	0	2208,41	Kr II	1
2218,38 2218,375 2218,289 2218,1082 2218,0569	Ti I Ar II Fe II Cu II Si I	5 1 30 50 120	2208,04 2207,9783 2207,29 2207,0692	Ne III Si I Ne III Fe I	4 110 8 6
2217,91	Cs II	3	2206 ,94	F III	3
2217,34	F III	5	2206 ,153	Fe II	8
2217,34	F II	5	2206 ,088	N II	6
2216,6688	Si I	120	2205 ,95	Ne III	5
2216,190	Ar II	4	2205 ,738	Ar II	4
2216 ,07 2215 ,67 2215 ,654 2215 ,60	Ne III O II Cu I Kr III	15 1 1000 2	2205 ,65 2204 ,98 2204 ,698 2204 ,668	Cu I Ne III Ar II Al I	5 7 1
2215 ,100 2215 ,094 2214 ,77 2214 ,67 2214 ,581 2214 ,17	Cu II Fe II Ne III He II Cu I Na III	35 10 4 6 1600 25	2204,619 2204,40 2204,16 2203,89 2203,88 2203,633 2202,78	Al I Ca III Ne Ne Ne IV N II	1 3 2 6 2 3
2214,147 2214,059 2213,76 2213,679 2213,56	Ar II Fe II Ne III Fe II Al III	1 20 12 20 2	2202,78 2202,54 2202,458 2202,22 2202,135	Na III C III Fe III Ne III Ar II	40 1 8 7
2213 ,15	Cs II	5	2201,595	Fe II	5
2212 ,96	Kr II	5	2201,573	Ar II	1
2212 ,741	Cu II	10	2201,242	Ar II	2
2212 ,63	Ne III	5	2201,23	Ne III	4
2212,40	Cs II	0	2200,82	Ne	5
2212,29	Kr II	6	2200,728	Ca I	1
2211,85	Ne III	10	2200,722	Fe I	15
2211,7441	Si I	110	2200,68	Cs	8
2211,71	Kr II	5	2200,498	Cu II	25
2211 ,30 2211 ,243 2211 ,2364 2211 ,16	Cs Fe II Fe I Na III	3 12 7 1	2200 ,37 2200 ,370 2199 ,752 2199 ,583 2199 ,30	Na III Fe I Cu I Cu I Ti III	10 1300 1700 1
2211 ,112	Fe II	5	2199,183	Al I	1
2211 ,07	F IV	1	2198,01	Na III	2
2210 ,952	Fe II	5	2197,86	Ne III	7
2210 ,883	Ar II	3	2197,84	Cu II	1
2210 ,8940	Si I	115	2197,787	Ca II	2

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λ	Symbol	I	λ	Symbol	I
2197,786 2197,506 2197,36 2197,273 2197,15 2197,10 2196,389 2196,0428 2195,674 2195,532 2195,445 2195,43 2194,907 2194,85 2194,251 2193,08 2192,74 2192,607 2192,52 2192,2678 2192,2678 2192,224 2192,06 2191,335 2191,838 2191,579 2191,45 2191,45 2191,45 2191,45 2191,27 2191,27 2191,215 2191,215 2191,2052 2191,16 2190,511 2190,42 2190,235 2190,29 2190,18 2190,00 2189,6323 2189,62 2189,47 2189,36 2189,47 2189,36 2189,47 2189,36 2189,47	Ar II N II F IV Fe II Cs Ne III Ar II Fe I Cu II Fe III Ar II Na III Na III Na III Na III Ar II Fe I Ar II Fe I Ar II Ne O II Ar II Cu II	1 4 0 5 6 3 1 0 5 6 5 2 5 2 1 1 1 1 7 5 1,5 1 7 5 2 1 5 0 6 0 4 1 2 3 5 2 8 1 0 4 4 2 2 7 5 6 5 1 1 0 3 2 1 3 3 3	2187,444 2187,320 2187,1950 2186,97 2186,876 2186,62 2186,61 2186,485 2186,31 2185,622 2185,52 2185,489 2185,13 2184,06 2183,980 2183,803 2183,468 2183,301 2183,30 2183,24 2182,85 2182,74 2182,85 2182,74 2182,85 2182,14 2182,13 2182,049 2181,720 2181,720 2181,720 2181,41 2181,378 2181,41 2181,407 2181,417 2181,407 2181,417 2181,407 2181,417 2181,407 2181,417 2181,407 2181,417 2181,417 2181,407 2181,417 2181,417 2181,407 2181,417 2181,417 2181,407 2181,417 21	Fe II Ar II Fe I O III Fe III Ne He II Fe I Cs Fe II Kr II Ar II N III Fe II Fe II Ca III Ne III Cu II Ne III Cu II Ne III Cu II Na III Cu II Ar II Cu II Fe II Ar II Cu II Na III Fe II Ar II Cu II	12 6 40 1 6 3 4 40 3 8 5 5 1 8 6 10 8 12 3 2 6 15 4 3 5 5 3 1700 1 1 4 5 7 8 8 10 10 10 10 10 10 10 10 10 10 10 10 10
2188,492 2188,39 2188,27 2188,22 2187,88 2187,87	C II N III Ar III Cs Cs II	3 5 10 3 3	2178,69 2178,37 2178,090 2177,79 2177,73	Ne III Mg III Fe I Kr II Ne III	4 3 35 3
2187 ,868 2187 ,678 2187 ,48	Fe II Fe II C II	15 10 1	2177,61 2177,432 2177,396 2177,22	Cs II Si I Al I Ar III	3 10 6 25

		•			
λ	Symbol	I	λ	Symbol	I
2177,025 2176,963 2176,894 2176,8414 2176,826 2176,67 2176,387 2175,959 2175,636 2175,445 2174,968 2174,849 2174,658 2174,585	Fe II C III Si III Fe I Fe II Ne III Ar II Ar II Fe II Cu II Fe II Fe III Ar II	10 4 5 6 20 5 1 2 10 25 35 8 15 5	2166,19 2165,860 2165,821 2165,555 2165,32 2165,24 2165,093 2164,915 2164,558 2164,547 2164,38 2164,351 2164,339	Ar III Fe I Ar II Fe II O III He II Cu I Al I Fe II Fe I Kr II Ar II Fe II	15 20 6 10 3 2 1300 2 25 7 4 2 20 6
2174,43 2174,190 2174,168 2174,071 2173,848 2173,84 2173,829 2173,720	Na III Ar II C II Al I C II Na III Fe III Fe II	3 2 3 2 5 1 7	2163,8633 2163,77 2163,54 2163,51 2163,370 2163,368 2163,32 2162,944 2162,88	Ne III Cs Ca III Fe II Fe I Na III C III	15 8 4 20 10 1 9 5
2173,220 2173,2146 2173,209 2172,989 2172,679 2172,637 2172,581 2172,341	Fe II Fe I Ar II Fe II Fe II Ar II Fe I Ar II Fe I Ar II	20 8 1 15 8 2 6 2	2162,68 2162,50 2162,50 2162,292 2162,023 2161,895 2161,65	Ti II Kr III Kr II Ar II Fe II Ar II O II	4 3 3 2 20 3 0
2172,25 2171,817 2171,60 2171,44 2171,418 2171,312 2171,2976 2171,045	Kr III Cu I Ca III F IV Ar II Ar II Fe I Fe III	1 200 5 4 5 3 40 12	2161,582 2161,5802 2161,314 2161,313 2161,270 2161,22 2161,161 2161,04	Fe II Fe I Cu II Fe II Fe III Ne III Fe II Ne III Ne III	20 5 20 20 10 10 15 6
2171,038 2170,914 2170,83 2170,63 2170,23 2170,193 2169,994	Ar II Ar II Kr III Na III Ar III Fe II	1 1 2 0 20 5 12	2160,88 2160,655 2160,52 2160,40 2160,388 2159,927 2159,60	Ne III Fe III O II Ca III Al I N II Ne III	2 6 0 2 3 3
2169,950 2169,562 2169,431 2168,925 2168,826 2168,26 2167,880	Fe II Cu I Fe II Fe II A1 I Ar III Fe II	12 300 10 8 2 10 12	2159,00 2159,50 2159,44 2159,199 2159,09 2159,046 2158,883	Ti II Ne III Fe II Fe II Ti II Ar II	3 5 25 10 5 2 2
2167,70 2167,401 2166,952 2166,773 2166,67 2166,198	Cs II Fe II Fe III Fe I Na III Fe II	3 12 12 12 100 3 20	2158 ,755 2158 ,755 2158 ,49 2158 ,472 2158 ,43 2158 ,29	Ar II Fe II Fe I Fe III Kr III Ti II	25 6 12 1

λ	Symbol		λ	Symbol	I
			<u> </u>	- Symbol	
2157,795 2157,710	Fe I Fe III	5 12	2146 ,91 2146 ,823	Cu II Ar II	8 2
2157,53 2157,280	Ar III Si III	$\frac{1}{3}$	2146 ,75	$\operatorname{Cs}\ \mathbf{II}$	10
2156,38	Ar III	3	2146 ,59 2146 ,339	N III Fe III	$\frac{00}{6}$
2156 ,28 2155 ,839	C II Fe II	$\frac{1}{12}$	2146 ,062 2146 ,058	Fe III Fe II	8 10
2155,588 2155,58	Ar II Ti II	1 4	2145,74	N III	1
2155,39	CII	0	2145 ,616 2145 ,58	Fe III C III	$\frac{6}{0}$
2154,70 2154,70	Ti II C II	$\frac{4}{0}$	2145 ,555 2145 ,48	Al I Cu II	$\frac{3}{10}$
2154,635 2153,980	Al III Ar II	1 3	2145,08	Kr II	10
2153,373	Fe II	12	2144 ,743 2144 ,70	Fe III Cu II	$\frac{7}{2}$
2153 ,281 2153 ,15	Fe II Ne III	$rac{5}{2}$	2144 ,282 2143 ,96	Fe III N III	8 0
$2153,068 \\ 2153,06$	Ar II Cs II	$\frac{3}{0}$	2143 ,827	Fe III	7 1
2153,0075	Fe I	5	2143 ,81 2143 ,52	Ca III Ti I	6
2152 ,706 2152 ,488	Fe III Fe II	$\frac{6}{25}$	2143 ,470 2143 ,045	Fe III Fe III	8 7
2152 ,47 2152 ,373	Ca III Fe II	$\frac{6}{12}$	2142 ,775	N II	6
2151,801	Cu II	25	2142 ,72 2142 ,67	Cu I N III	5 0
2151 ,78 2151 ,776	Ne III Fe III	3 15	2142 ,49 2142 ,49	Kr III C III	1 1
2151 ,774 2151 ,61	Fe II N III	$ \begin{array}{c} 25 \\ 0 \end{array} $	2142 ,263	Ar II	2 5
2151 ,26	Ne III	$\frac{5}{6}$	2142,05 2141,682	Ti I Ar II	2
2151,052 2150,78	Ar II Ca I	1	2141,30 2140,92	Cs C III	10 1
2150 , 7 62 2150 , 7 0	Fe II Ne III	10 8	2140 ,747	Ar II	$\frac{2}{2}$
2150,699	Al I	5 20	$2140,56 \\ 2140,39$	Cu I Ca III	$\frac{2}{6}$
2150 ,618 2150 ,537	Fe II Ar II	2	2139,86 2139,676	C III Fe II	$\begin{array}{c} 1 \\ 25 \end{array}$
2149 ,96 2149 ,92	N III Ne III	$\frac{0}{6}$	2139 ,48	Cs II	
2149 ,47 2149 ,40	O II Cu I	0 1 0	2139 ,41 2139 ,007	Ti I N II	$egin{array}{c} 2 \ 5 \ 4 \end{array}$
2149,07	Ar III	3 1	2138 ,882 2138 ,70	Ar II Kr III	3
2148 ,99 2148 ,9838	N III Cu II	60	2138,70	Ar III	10
2148,73	Ar III	8	2138,533 2138,103	Cu I Fe II	500 20
2148,58 2148,47	Kr III N III	$\frac{2}{3}$	2137 ,897	CII	5
2148 ,38 2148 ,23	Ar III O II	$\frac{5}{0}$	2137,735	Fe II C II	15 3
2148 ,09	NIII	3	2137 ,417 2137 ,365	Fe III	8 3
2147 ,95 2147 ,911	Ar III Si I	$\begin{array}{c} 6 \\ 50 \end{array}$	2136 ,73 2136 ,560	Ar III Si II	50
2147 ,904 2147 ,79	Fe III N III	$\frac{7}{2}$	2136,519	Fe II	20
214 7 ,719	Fe II	15	2136 ,402 2136 ,17	Si II Cs II	30 3
2147 ,681 2147 ,37	Ar II Na III	$\frac{2}{1}$	2135 ,9815 2134 ,861	Cu II Fe III	7 5
2147,27	N III	4	2134 ,733	Al I	2

λ	Symbol	I	λ	Symbol	I
2134,72 2134,3413 2133,99 2133,990 2133,87 2133,85 2133,77 2132,304 2131,99 2131,85 2131,76 2131,505 2131,49 2131,23 2130,762 2130,548 2130,762 2130,548 2130,429 2130,259 2130,179 2130,08 2129,810 2129,80 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,75 2129,663 2129,54 2129,427 2129,20 2128,750 2128,750 2128,750 2128,750 2127,69 2127,69 2127,696 2127,050 2128,720 2128,720 2128,720 2128,730 2124,80	Mg III Cu II Si II Fe II Ar III Cs II Ca II Ca II Ca II Cu II Ca II Cu II Fe II Ar II Fe II Ar II Kr II Kr II Fe II Ar II Fe II Ar II Fu II Ar II Fu II Ar II Cu II Ar II Cu II Ar III Cu II Cu II Cu II	3 35 10 8 15 2 0 1 4 10 5 2 3 2 50 12 6 15 5 8 3 1 1 1 6 4 6 0 6 3 6 3 4 2 5 1 1 1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2121,542 2121,306 2121,1945 2120,179 2119,985 2119,125 2119,050 2118,948 2118,33 2118,567 2118,38 2117,633 2117,633 2117,633 2117,633 2117,630 2117,01 2116,687 2116,588 2116,00 2115,55 2115,1697 2115,090 2114,72 2114,631 2114,532 2114,488 2113,46 2113,46 2113,46 2113,26 2113,146 2113,26 2113,146 2113,08 2112,966 2112,757 2112,65 2112,1001 2111,30	Ar II Ar II Si I Si IV Ar II Fe I Fe II Ar II Kr II Fe III Cu II Fe II Cu II Ti I Fe II Na III Fe II Kr III Cu II Fe I Ti I Cu II Fe I Ar II Fe I Ar II Fe I Fe I Ar II Fe I Fe I Fe I Fe I Ca II Fe I Fe I Ca II Fe I F	1 2 10 3 3 5 12 1 12 6 2 8 1 0 25 35 6 25 8 5 7 1 0 20 1 0 30 1 25 6 2 2 1 20 25 10 5 30 6 20 2 2 2 15 25
2124,27 2124,1225 2123,590	Ne Si I Fe III	7 100 8	2110 ,233 2109 ,861 2109 ,81	Fe I Fe I Kr II	30 25 5
2123,50 2123,48 2123,39 2123,362 2122,994	Ti I Kr II O II Al I Si I	7 3 0 1 15	2109,613 2109,37 2109,11 2109,097 2109,046	Fe II Cl II Cs Fe II Ar II	25 2 6 10 2
2122 ,9793 2122 ,34 2122 ,27 2121 ,90	Cu II Ar III Cs II Ti I	50 8 1 6	2108,959 2108,886 2108,302 2108,139 2108,139	Fe I Ar II Fe I Fe II Fe I	30 1 12 15 12

λ	Symbol	ı	λ	Symbol	I
2108,068 2107,62 2107,555 2107,324 2107,13 2106,387 2106,380 2106,260 2106,247 2105,935 2105,45 2105,412 2104,885 2104,7971 2104,24 2103,94 2103,799 2103,353 2103,235 2103,213 2103,08 2103,048 2102,99 2102,910 2102,3542 2102,33 2101,49 2101,467 2101,29 2100,69 2100,466 2100,7984 2100,69 2100,46 2100,144 2099,91 2099,68 2099,60 2099,59 2099,50 2099,59 2098,972 2098,972 2098,972 2098,972 2098,953 2098,72 2098,953 2098,72 2098,953 2098,72 2098,953	Ar II Na III Fe II Fe II Cu II Fe I Fe I Ar II O III Ar II Cu II Ar II Cu II Cu II Cu II Cu II Cu II Fe III Ti IV Fe III Fe I Ti IV Fe III Fe I O II Fe I INe Cs Ar II O II Fe III Fe I O II Fe III Fe II Ti IV Fe III Fe II Fe III Fe II Fe III	2 1 10 10 5 1 2 25 20 1 5 3 1 800 3 40 1 2 12 5 10 30 2 8 1 4 8 30 1 0 10 1 5 1 4 4 10 6 1 25 25 15 25	2096,856 2096,808 2096,430 2096,24 2096,23 2096,192 2095,976 2095,54 2095,54 2095,20 2094,8 2094,77 2094,30 2094,211 2094,183 2094,15 2093,660 2093,64 2093,666 2093,37 2093,43 2092,945 2092,90 2092,764 2092,44 2092,337 2091,97 2091,90 2091,97 2091,90 2091,97 2091,90 2091,83 2091,63 2091,63 2091,63 2091,63 2091,63 2091,316	N II Ar II Fe III Kr II Ne N II Ar II N II N II N II N II Al II Kr II Al II Si I N II Ne Fe II Fe I Ne Cu II Kr II C II Fe III O II Ar II C III C III Fe III C III Fe III Ne The III The II	5 1 6 15 12 4 1 6 20 5 1 5,5 2 6 10 3 2 35 40 3 10 3 16 1 3 4 4 12 3 6 8 4 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1
2098 ,123 2098 ,081 2098 ,00	Ar II Fe I Ne	1 15 1	2088,71 2088,16 2087,930 2087,907	Cs II Kr II Cu II Fe III	8 20 35 7
2097,692 2097,52 2097,512 2097,480 2097,43	Fe III Cs II Fe II Fe III Ne	$egin{array}{c} 12 \\ 0 \\ 25 \\ 15 \\ 2 \\ \end{array}$	2087,718 2087,527 2087,525 2087,44 2087,132	Ar II Fe II Fe I Ne III Fe III	1 25 25 7 8

λ	Symbol	1	λ	Symbol	I
2087,0 2086,96 2086,816 2086,73 2086,55 2085,56 2085,295 2084,54 2084,4669 2084,349 2084,33 2084,117 2083,87 2083,75 2083,75 2083,75 2080,912 2082,109 2081,5 2080,912 2080,53 2080,357 2080,34 2080,05 2080,03 2079,968 2079,654 2079,654 2079,529 2079,06 2078,989 2078,986 2079,654 2079,529 2079,06 2078,989 2078,95 2078,646 2078,164 2077,507 2077,43 2077,507 2077,43 2077,507 2077,43 2077,507 2077,43 2077,507 2077,43 2077,507 2077,43 2077,507 2074,17 2076,944 2076,29 2076,178 2076,683 2077,683 2073,60 2073,88 2073,60 2073,426 2073,38 2073,426	Al II Ne III Ar II Kr II Mg III Ne Cu II Kr II Si I Fe III Cu II Fe I Kr II Cs Fe III Cs II Ar II Ar II Ar II NI Cu II Fe II IN I	5 10 25 25 10 10 20 1 86 7 23 20 1 56 8 23 6 4 20 14 15 40 8 24 8 4 8 2 2 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2070,539 2070,330 2069,952 2069,952 2068,321 2068,25 2068,243 2067,64 2067,50 2067,41 2067,302 2066,25 2066,005 2065,54 2065,516 2065,23 2064,212 2063,99 2063,761 2063,672 2063,50 2063,13 2062,97 2062,62 2062,41 2061,751 2061,751 2061,751 2061,751 2061,552 2061,192 2060,079 2059,617 2059,190 2059,014 2058,72 2058,646 2058,560 2058,47 2058,10 2058,10 2058,00 2057,61 2057,332 2057,514 2057,332 2057,514	Fe III Fe II Cu II Cu II Cu II Cu II Cu II Cu II N III Fe III Cu II Fe III Cu II Fe III Fe III Mg III Si I Na III Ne Fe II Ar II N III Cu II Fe III Cu II	8 8 8 10 2 2 5 6 12 200 2 5 10 20 2 5 10 20 2 5 10 00 8 2 10 3 9 10 40 1 7 1 50 8 50 8 3 15 3 3 1 3 5 12 6 3 4
2072,86 2072,70I 2072,016 2071,821 2071,79 2070,63	N III Si II Si II Fe II N III N III	1 200 200 10 2 5	2056 ,145 2056 ,13 2055 ,93 2055 ,855 2055 ,270	Fe III Mg III Ne VI Fe III Fe II Na III	7 3 3 6 20 10

2054,9765 Cu II 50 2033,064 Fe II 25 2054,828 Si I 50 2032,65 Na III 0 2054,54 Ti II 3 2092,473 Ar II 3 2054,43 Cu II 6 2092,173 Ar II 3 2052,53 O III 4 2031,10 Na III 10 2052,53 O III 4 2031,10 Na III 10 2052,53 O III 4 2031,023 Cu II 15 2051,90 Na III 8 2051,75 Cs II 0 2002,55 Na III 1 1 1 2 2051,75 Cs II 0 2002,55 Na III 1 1 2 2051,75 Cs II 0 2002,55 Na III 2 2051,75 Cs II 0 2002,55 Na III 2 2051,75 Cs II 0 2002,55 Na III 2 2050,739 Fe III 5 2007,778 Fe II 5 2007,778 Fe II 5 2004,94 Ar II 2 2006,68 Ca III 2 2049,94 Ar II 2 2006,68 Ca III 2 2049,94 Ar III 2 2005,894 Mg I 9 2049,384 Fe III 7 2005,894 Mg I 9 2049,384 Fe III 7 2005,894 Mg I 9 2049,384 Fe III 7 2005,4902 Cu II 8 2044,395 Cu II 8 2047,72 Al II 1 1 2 2024,733 Ar II 2 2047,72 Al II 1 1 2 2025,183 Ar II 3 2047,995 Ar II 4 2024,733 Ar II 2 2047,73 Ar II 2 2047,65 Cu II 8 2047,72 Al II 4 2024,733 Ar II 2 2047,65 Cu II 8 2047,40 Ar II 4 2024,733 Ar II 2 2047,65 Cu II 8 2047,41 Ca III 3 2025,05 Cs II 5 2047,995 Ar II 4 2022,83 Ar II 4 2024,43 Ar II 2 2047,40 Ar II 4 2024,733 Ar II 2 2047,40 Ar II 4 2024,733 Ar II 2 2047,40 Ar II 4 2024,733 Ar II 2 2047,40 Ar II 4 2024,43 Ar II 4 2024,44 Ar II 4 2024,43 Ar II 4 2024,44 Ar II 4 2024,44 Ar II 4 2024,45 Ar II 4 2024,45 Ar II 4 2						
2054, 258 Si 50 2022, 265 Na III 0	λ	Symbol	I	λ	Symbol	I
2042, 382 Ne VI 3 2042, 355 Ar II 3 2041, 61 Ca III 4 2041, 49 Ti II 3 2041, 345 Fe II 25 2041, 204 Fe I 25 2041, 99 Na III 0 2044, 99 Na III 0 2044, 99 Na III 0 2044, 99 Na III 0 2040, 687 Fe II 25 2040, 23 Mg III 3 2040, 23 Mg III 3 2039, 93 Al II 3 2039, 507 Fe III 6 2039, 490 Ar II 3 2037, 70 Na III 3 2037, 70 Na III 30 2037, 1269 Cu II 30 2036, 42 N IV 1 2036, 42 N IV 1 2036, 42 N IV 4 2035, 8539 Cu II 30 2035, 8539 Cu II 30 2035, 84 Na III <td< td=""><td>2054,9795 2054,828 2054,54 2054,43 2054,27 2052,53 2052,16 2051,79 2051,75 2051,688 2050,794 2050,739 2050,324 2049,94 2049,913 2049,94 2049,913 2049,384 2048,67 2048,492 2048,36 2047,79 2047,72 2047,65 2047,72 2047,65 2047,14 2046,65 2046,492 2046,25 2046,00 2045,62 2045,41 2045,41 2045,41 2045,41 2045,41</td><td>Cu II Si I Ti II Cu II Cu II O III C II Na III C II CS II Fe II Ar II Fe III Ar II Fe III Na III Fe III Ca III</td><td>50 50 3 6 4 4 2 8 2 0 25 5 7 2 7 2 7 8 5 3 2 1 8 3 4 4 00 00 00 5 18 18 18 18 18 18 18 18 18 18</td><td>2033,064 2032,65 2032,173 2032,14 2031,10 2031,023 2030,01 2029,182 2028,558 2028,55 2028,38 2027,778 2027,72 2026,68 2026,602 2025,824 2025,4902 2025,44 2025,183 2025,05 2024,733 2024,733 2024,335 2024,21 2023,118 2022,83 2022,73 2022,29 2022,27 2022,14 2021,46</td><td>Fe II Na III Cl III Na III Cl III Cu II Ca III Fe II Ar II Ca III Fe II Ca III Ar II Cu II Cu II Cu II Cu II Ar II Cu II Ar II Cu II Ar II Cu I Cl III Ar II Cu I Cl III Ar II Co II Ar II Co II</td><td>25 0 3 3 10 15 1 8 1 25 2 2 2 9 8 8 3 5 2 2 2 9 8 8 3 5 2 2 2 9 8 8 8 9 1 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0</td></td<>	2054,9795 2054,828 2054,54 2054,43 2054,27 2052,53 2052,16 2051,79 2051,75 2051,688 2050,794 2050,739 2050,324 2049,94 2049,913 2049,94 2049,913 2049,384 2048,67 2048,492 2048,36 2047,79 2047,72 2047,65 2047,72 2047,65 2047,14 2046,65 2046,492 2046,25 2046,00 2045,62 2045,41 2045,41 2045,41 2045,41 2045,41	Cu II Si I Ti II Cu II Cu II O III C II Na III C II CS II Fe II Ar II Fe III Ar II Fe III Na III Fe III Ca III	50 50 3 6 4 4 2 8 2 0 25 5 7 2 7 2 7 8 5 3 2 1 8 3 4 4 00 00 00 5 18 18 18 18 18 18 18 18 18 18	2033,064 2032,65 2032,173 2032,14 2031,10 2031,023 2030,01 2029,182 2028,558 2028,55 2028,38 2027,778 2027,72 2026,68 2026,602 2025,824 2025,4902 2025,44 2025,183 2025,05 2024,733 2024,733 2024,335 2024,21 2023,118 2022,83 2022,73 2022,29 2022,27 2022,14 2021,46	Fe II Na III Cl III Na III Cl III Cu II Ca III Fe II Ar II Ca III Fe II Ca III Ar II Cu II Cu II Cu II Cu II Ar II Cu II Ar II Cu II Ar II Cu I Cl III Ar II Cu I Cl III Ar II Co II	25 0 3 3 10 15 1 8 1 25 2 2 2 9 8 8 3 5 2 2 2 9 8 8 3 5 2 2 2 9 8 8 8 9 1 1 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0
2040,687 Fe II 25 2018,754 Ar II 2 2040,23 Mg III 3 2018,441 Ne IV 3 2039,93 Al II 3 2018,38 C II 2 2039,507 Fe III 6 2017,94 C II 1 2039,490 Ar II 3 2017,990 Fe II 15 2037,70 Na III 10 2017,090 Fe I 15 2037,1269 Cu II 30 2016,885 Cu II 8 2036,435 Fe II 20 2016,885 Cu II 1 2036,42 N IV 1 2016,654 Si II 3 2036,10 N IV 4 2016,654 Si II 3 2035,8539 Cu II 30 2016,60 O II 2 2035,84 Na III 3 2016,154 Fe I 5 2035,57 N IV 5 2016,092 Fe II 10 2035,02 N III 3 2015,77 C III 0 2034,760	2043,37 2042,382 2042,355 2041,61 2041,49 2041,345 2041,204	Ne VI Ar II Ca III Ti II Fe II Fe I	$\begin{array}{c} 3 \\ 3 \\ 4 \\ 3 \\ 25 \\ 25 \end{array}$	2020,83 2020,739 2020,44 2020,19 2019,427	Ca III Fe II O II Cl III Fe II	$\begin{array}{c} 3 \\ 25 \\ 2 \\ 3 \\ 25 \end{array}$
2038,35	2040,687 2040,23 2039,93 2039,507	Mg III Al II Fe III	$egin{array}{c} 3 \ 3 \ 6 \end{array}$	2018 ,754 2018 ,441 2018 ,38	Ar II Ne IV C II	$egin{array}{c} 2 \ 3 \ 2 \end{array}$
2035,8539	2038,35 2037,70 2037,1269 2036,435 2036,42	Ca III Na III Cu II Fe II N IV	3 10 30 20 1	2017,090 2016,885 2016,84 2016,654	Fe I Cu II C III Si II	15 8 1 3
2035,02 N III 3 2015,7 C III 0 2034,88 Cl III 3 2015,576 Cu II 5 2034,760 Ar II 2 2015,500 Fe II 20 2033,78 Cs II 0 2015,319 Ar II 2 2015,319 Ar II 2 2033,46 Ca III 4 2014,311 Ar II 1	2035,8539 2035,84 2035,62 2035,57	Cu II Na III N III N IV	30 3	2016 ,512 2016 ,154 2016 ,092	Fe I Fe II Fe II	5 10 10
	2035 ,15 2035 ,02 2034 ,88 2034 ,760 2033 ,78	N III Cl III Ar II Cs II	$\begin{array}{c} 3 \\ 3 \\ 2 \\ 0 \end{array}$	2015 ,576 2015 ,500 2015 ,319	Cu II Fe II Ar II	$\begin{array}{c} 5\\20\\2\\1\end{array}$

λ	Symbol	I	λ	Symbol	I
2014 ,10 2013 ,268	Ca III Fe II	3 15	1991 ,848 1991 ,64	Si I N II	50 —
2012 ,96 2011 ,88 2011 ,34	Cu II Na III Cl III	15 30 1	1991 ,613 1990 ,53	Fe III Al II	14 7
2010 ,974 2010 ,688	Si I Fe II	30 25	1990 ,1 1989 ,975 1989 ,61	Cs Fe III Ca III	1 7 2
2010,094 $2009,90$	C III Ca III	5 1 4	1989 ,2116 1988 ,9950	Cu II Si I	30 15
2009 ,570 2009 ,327 2008 ,494	C III C III Fe III	2 6	1988,620 1988,51 1988,09	Ar II C II C II	3 1 2
2008 ,439 2008 ,43	Si I Na III	15 8	1987 ,76 1987 ,503	C II Fe III	3 15
2007 ,711 2007 ,452 2007 ,215	Fe II Fe II Fe I	12 15 15	1987,33 1986,3637 1985,58	C II Si I Na III	1 10 30
2007,178 2007,013	Ar II Fe II	1 12	1985 ,30 1985 ,1 1984 ,434	Cs Si I	1 30
2006 ,84 2006 ,260 2005 ,83	Cl III Fe I Cs II	4 15 00	1984,288 1984,027 1983,831	Fe III Fe III Ar II	9 7 1
$2005,55 \\ 2005,33$	Mg III Na III	$\frac{0}{6}$	1983 ,7 1983 ,61	Cs Cl III	1 5
2005 ,24 2004 ,914 2004 ,80	Na III Ar II Na III	$\frac{30}{3}$	1983,296 1983,2341	Ar II Si I	1 20
2004 ,143 2003 ,97	Fe III Cl III Ar II	8 0 2	1982,805 1982,076	Fe III	8 6
2003 ,903 2003 ,325 2003 ,09	Ar II Ar II Ca III	1 3	1981 ,974 1981 ,74 1981 ,5	Ne VII Ar II Cs	6 1 1
2002,72 2000,96 2000,78	Cl III Ca III Cu III	3 4 3	1981 ,394 1980 ,95	Ar II Na III	2
2000,78 2000,368 2000,228	Fe II Fe III	30 9	1980 ,6203 1980 ,129 1979 ,988	Si I Fe I Ar II	15 25 1
2000,000 1999,79 1999,7000	Ar II Ca III Cu II	$\begin{array}{c} 2\\4\\60 \end{array}$	1979 ,62 1979 ,46	Cl III C III	1 3
1999,588 1999,430	Fe III Fe II	9	1979 ,3124 1979 ,31 1979 ,2062	Cu II Mg III Si I	50 1 15
1997,345 1996,5 1996,420	Ne VII Cs Fe III	1 5 12	1979 ,16 1978 ,702	C III Xe III	3
1995,62 1995,563	Na III Fe III	3 12	1978,63 1977,5982 1977,56	Ca III Si l Mg III	3 15 1
1995 ,266 1994 ,857 1994 ,073	Fe III Fe II Fe III	7 20 13	1977,14 1977,02	Na III Cu II	1 15
1993,627 1993,289	C I Fe II	2 8	1976 ,8 1976 ,765 1976 ,62	Cs Ar II· Na III	1 3
1993 ,262 1992 ,858	Fe III Fe III	7 6	1976,02 1976,126 1975,58	Fe III Na III	1 8
1992,196 1992,060 1992,017	Fe III Ne VII Fe III	9 3 9	1974 ,5 1974 ,467	Cs Ar II	0 1 3
1991,9	Cs	1	1973 ,780 1973 ,4837	Ar III Ar II	4 2

					
λ	Symbol	I	λ	Symbol	I
1972 ,6	Xe II	5	1956 ,58	Mg IV	0
1972,270	Ar II	$\overset{\circ}{2}$	1956,48	Na III	ŏ
1972 ,01	Ca III	1	1956,026	Fe I	30
1971 ,57	Cs II	3	1955,690	Fe I	$\frac{30}{20}$
1971 ,57	Mg III	0	1955,31	Na III	8
1970,489	Cu II	15	1955,3	Cs	1
1968,21	Cs II	2	1954,975	Fe III	8
1968,03	Ca III	5	1954,966	Si I	100
1967,99	Cu II	$\frac{2}{1}$	1954,87	Mg III	0
1966 ,952	Ar II	1	1954,223	Fe III	10
1966,91	Cs II	2	1953,80	N III	3
1966,740	Fe III	8	1953,66	N III	3
1965,309	Fe III	8	1953 ,488	Fe III	10
1965,23	Al II	4	1953,322	Fe III	13
1965,04	Na III	18	1953,06	Ca III	4
776, 1964	Fe III	8	1952,997	Fe I	20
1964,70	Ca III	.5	1952 ,648	Fe III	11
1964 ,330	Fe II	1 2	1952,596	Fe I	30
1964,260	Fe III	7 0	1952,56	Cu II	5
1964,25	OII	_	1952,262	Fe I	20
1964, 169	Fe III	8	1952,20	N III	1
1964,043	Fe I	20	1952 ,16	Ca III	3
1963,84	O II	$\frac{2}{15}$	1951,556	Fe I	25
1963,629	Fe I Fe II	$\frac{15}{25}$	1951,43	NIII	$\frac{2}{2}$
1963 ,110			1951,21	Na III	40
1963 ,110	Fe I	$\frac{25}{22}$	1951,007	Fe III	12
1962 ,871	Fe I	20	1950,79	Na III	15
1962,746	Fe I Ar III	$\frac{15}{2}$	1950 ,334	Fe III	10
1962 ,74 1962 ,67	Al II	7	1950,334	Fe I	20
·			1949,81	NIII	4
1962,3	Cs	$\frac{0}{3}$	1949,564	Si II	100
1962,24	O II Mg III	0	1949 ,331	Si II	10
1962 ,18 1962 ,164	Ar II	$\ddot{3}$	1949,22	N III	6
1962,104	Fe I	30	1948,79	Ti III	5
			1948,372	Fe II	10
1962 ,031 1961 ,4	Fe I Cs	$\frac{25}{2}$	1948,31	Ca III	5
1961,4 1961,3610	Ar II	4	1946,99	N III	5
1961 ,236	Fe I	$2\dot{0}$	4046 079	Eo I	25
1961,230	Fe III	6	1946 ,978 1946 ,8000	Fe I Ar II	$\frac{25}{2}$
1960 ,76	Na III	20	1946,70	Na III	$\bar{0}$
1960,70	Al II	3	1946,49	Cu II	10
1960,34	O II	1	1946,43	Na III	20
1960 ,318	$\mathbf{Fe}\ \mathbf{III}$	13	4046 940	Fe I	10
1960 ,129	$\mathbf{Fe} \mathbf{I}$	30	1946 ,219 1946 ,20	Mg IV	0
1959 ,324	Fe III	8	1945,504	Si II	$\ddot{3}$
1959 ,524 1958 ,739	Fe I	15	1945,35	Al II	5
1958,598	Fe I	30	1945,342	Fe III	12
1958, 583	Fe III	11	1	13. I	95
1958 ,29	Al II	1	1945,294	Fe I Ar II	25 1
		2	1945 ,111 1945 ,1	Cs	1
1958,18	Ca III Fe II	5 5	1945,070	Fe I	20
1958 ,121 1957 ,938	Fe III	$\overset{3}{6}$	1944,99	Na III	$\ddot{3}$
1957 ,831	Fe I	$2\overset{\circ}{5}$			
1957 ,83	Ar III	1	1944,586	Si II	$\begin{array}{c} 15 \\ 25 \end{array}$
		90	1944,586	Cu II Fe III	25 14
1957,51	Cu II	$\begin{array}{c} 20 \\ 0 \end{array}$	1943 ,481 1943 ,40	Na III	6
1957,42	O II Ti I I I	0	1943,40	Ca III	$\ddot{6}$
1957,02	11111	U	1010,14		04

λ	Symbol	I	λ	Symbol	I
1942,3 1942,19	Cs Na III	4 6	1926 ,27 1926 ,18	Na III Ti III	45 0
1941 ,77 1941 ,667 1941 ,61	Na III Si II Na III	$\begin{array}{c} 0 \\ 50 \\ 0 \end{array}$	1926 ,013 1925 ,99 1925 ,99	Fe III Al II Mg IV	10 2 0
1941 ,50 1941 ,40 1941 ,2	Mg III Ti III Cs	0 4 0	1925 ,987 1925 ,0	Fe II Cs	$\overset{\circ}{\overset{\circ}{0}}$
1941,2 1941,0724 1940,649	Ar II Fe I	3 25	1924 ,81 1924 ,532 1923 ,88	Al II Fe III Kr III	4 6 0
1940 ,018 1939 ,72 1939 ,32	Fe III Ca III Na III	8 4 0	1923 ,877 1923 ,87	Fe III Mg III	$\frac{7}{3}$
1935,32 1939,30 1938,95	Al II Mg III	5 0	1923 ,86 1923 ,4 1923 ,35	N III Cs Cl II	2 2 4
1938,827 1938,901 1938,899	Ne II Fe III Fe II	8 10 8	1923 ,31 1923 ,14	C III	2 4
1938,8 1937,80	Cs Mg III	2 2	1923 ,11 1923 ,003 1922 ,93	N III Fe III C III	2 7 5
1937 ,4 1937 ,345 1937 ,274	Cs Fe III Fe I	1 14 35	1922 ,797 1922 ,789	Fe II Fe III	20 15
1937 ,042 1936 ,96	Ar II Al II	1 4	1922 ,13 1921 ,630 1921 ,49	Cu II Xe II I N III	5 2 4
1936 ,781 1936 ,0 1935 ,83	Fe II Cs Al III	20 0 10	1920 ,86 1920 ,665	N III Cu II	8 5
1935,79 1935,54	Ca III Na III	3 0	1920 ,32 1920 ,12 1920 ,016	Cl III Na III Ar II	$\begin{array}{c} 4 \\ 6 \\ 2 \end{array}$
1935 ,296 1935 ,2 1935 ,18	Fe II Cs Ti III	15 8 3	1920 ,0 1919 ,99	Cs N III	1 2
1934 ,75 1934 ,54 1934 ,528	Al II Al II Fe I	$egin{array}{c} 10 \\ 10 \\ 25 \end{array}$	1919 ,71 1919 ,515 1919 ,44	N III Ar III N II I	2 4 1
1933 ,87 1933 ,694	Na III Ar II	$\frac{30}{2}$	1919,3 1919,197	Cs Ar II	1 3
1933 ,59 1932 ,477 1932 ,43	Mg III Fe II Al II	0 15 5	1919,06 1918,76 1918,69	N III Mg III N III	0
1932,231 1931,507 1931,421	Ar II Fe III Ar II	2 14 1	1918,667 1918,480	Ar III Fe III	0 4 7
1931,027 1930,905	C III	4 10	1918,46 1918,284 1918,06	Na III Fe III	6 7
1930 ,9 1930 ,64 1930 ,387	Cs Mg III Fe III	1 3 15	1917,960 1917,87	Ar III Fe III Cl III	1 6 4
1930,033 1930,03	Ne II Al II	13 8 5	1917 ,453 1917 ,351 1917 ,337	Fe III Fe III	9 8
1929 ,74 1929 ,34 1928 ,787	Cu II Ti III Ne II	25 1 1	1916,53 1916,48	Fe II Cl III O III	15 4 2
1928,787 1928,715 1927,21	Cu III Na III	$\frac{1}{2}$	1916,081 1915,6 1915,564	Ne II Cs	10 3
1926 ,99 1926 ,304	Al II Fe III	18	1915,364 1915,083 1914,653	Ar III Fe III Ar III	7 15 3

					
λ	Symbol	I	λ	Symbol	1
1914,6 1914,398 1914,09 1914,086	Cs Ar III Cl III Kr III	4 9 3 3	1897,27 1897,1 1896,904	Ti III Cs Xe III	0 0 5
1914,056 1913,17	Fe III Na III	19 8	1896 ,803 1896 ,8 1896 ,26	Fe III Cs Mg III	$9 \\ 0 \\ 0 \\ 2$
1912,90 1911,338 1910,91 1910,669	Cl III Fe III Al II Fe II	4 7 5 8	1895 ,7 1895 ,675 1895 ,456	K Fe II Fe III	10 20
1910 ,621 1910 ,401	Si II Fe III	$\begin{array}{c} 50 \\ 6 \end{array}$	1894 ,49 1894 ,17 1894 ,006	C III Ca III Fe II	$egin{array}{c} 2 \\ 3 \\ 10 \end{array}$
1910 ,2 1910 ,17 1909 ,74	Cs Ca III Ti II	$egin{array}{c} 0 \ 4 \ 2 \end{array}$	1893 ,981 1893 ,87 1893 ,245	Fe III Mg IV Si I	11 1 200
1909 ,33 1908 ,96 1908 ,46	Ti II N III Mg III	2 1 3	1892 ,92 1892 ,7 1892 ,030	Ca III K Si III	$egin{array}{c} 1 \ 2 \ 3 \end{array}$
1908 ,29 1908 ,11 1908 ,1	Ti II N III Cs	3 7 1	1890 ,9 1890 ,75 1890 ,669	K Na III Fe III	12 13 2
1907 ,989 1907 ,577 1907 ,494 1907 ,46	Ar II Fe III Ne II Ca III	4 10 8 2	1890 ,35 1889 ,714 1889 ,2	Mg III Ne II Cs	1 6
1907, 28 1907, 06 1906, 89	N III O III N III	4 1 1	1889,06 1889,056 1889,029	Cl III N I Ar II	$egin{array}{c} 0 \ 2 \ 6 \end{array}$
1906 ,814 1906 ,71	Fe III Mg IV	6 0	1888 ,788 1888 ,729 1888 ,32	Ar II Fe II Fe I	$egin{array}{c} 4 \\ 20 \\ 12 \end{array}$
1906 ,57 1906 ,457 1906 ,30 1906 ,22	Al II Fe III Ti II N III	4 6 3 1	1888 ,110 1887 ,9 1887 ,761	Ne II K Fe I	1 2 14
1905 ,878 1904 ,787	Si II Fe II Si I	3 15 50	1887,700 1887,48 1887,471	Si I Na III Fe III	200 15 8
1904,660 1904,38 1904,326 1902,89	Al II Si II O III	5 5 1	1887 ,45 1887 ,31	N II Mg III	4 0
1902 ,459 1902 ,402	Si II Fe III Cl III	100 6 5	1887,197 1886,757 1886,387 1885,75	Fe III Fe III Ar II Na III	8 12 4 4
1901 ,61 1901 ,55 1901 ,331	Mg III Si I	1 1 000	1885 ,25 1885 ,125 1884 ,596	N III Fe III Fe III	10 9 8
1901 ,31 1901 ,096 1900 ,7	Ti III Fe III Cs	3 9 1	1884,0 1883,799 1883,14	Cs Ne II Cl II	6 1 3
1900 ,638 1899 ,834 1899 ,70	Ar II Ar II Na III	4 1 3	1882,92 1882,36 1882,250	N V N V Cu III	$\begin{array}{c}1\\0\\2\end{array}$
1899 ,271 1899 ,17 1898 ,870	Ar II Al II Fe III	1 4 6	1882,047 1881,851 1881,19	Fe III Si I Al IV	10 200 1 20
1898 ,538 1897 ,85	Fe II Cl III Cs	10 3 0	1880 ,976 1880 ,953 1880 ,21 1880 ,14	Fe II Si I Ne II Fe I	$\begin{array}{c} 20 \\ 20 \\ 3 \\ 5 \end{array}$
1897 ,7 1897 ,49	Cs Al II	$\overset{o}{2}$	1880,10	Clill	3

1879,788			K				
1879,46	λ	Symbol	1	λ	Symbol	I	
1872,45 Na III	1879,788 1879,46 1879,46 1878,60 1878,48 1877,989 1877,6 1877,523 1877,462 1877,13 1876,835 1876,424 1876,424 1876,173 1875,536 1874,907 1874,838 1874,59 1874,22 1873,217 1873,217 1873,217 1873,217 1873,217 1873,217 1873,217 1873,217	8 Ar II Mg III 9 Ar II N II Al II 9 Fe III Cs 8 Ar II 12 Fe II Al II 5 Fe II 13 Fe II 14 Si I 15 Fe II 16 Si I 17 Si I 18 Mg IV 18 Na III 18 Na III 19 Fe I 10 Na III 10 Fe I 11 Na III 11 Fe I 12 Ar II 13 Fe II 14 Ar II 15 Fe II 16 Ar II 17 Fe II 18 Fe II 19 Fe II 10 Fe II 11 Fe II 12 Fe II 13 Fe II 14 Fe II 15 Fe II 16 Fe II 17 Fe II 18 Fe II	2 4 1 2 3 12 1 4 20 1 1 15 10 8 100 15 5 5 500 0 0 4 15 1 1 2 6 100 1	1859,99 1859,744 1859,61 1859,3 1859,22 1859,20 1858,685 1858,53 1858,19 1858,05 1857,935 1857,88 1857,88 1857,69 1857,57 1856,73 1856,73 1856,690 1855,95 1855,95 1854,76 1854,76 1854,72 1854,715	Al II Fe II Na III Cs N II Na III Cu III N II Mg III AI II Fe II N V N II N V Na III Fe III AI II Fe III AI II Ca III AI II Fe III AI II Fe III AI II Fe III AI II Ca III AI III Ca III AI III Ca III Ne III Ne II	3 15 0 2 5 0 1 2 2 10 12 3 3 5 20 7 8 15 15 9 3 6 10 6 1	
1866,07 Fe I 12 1848,74 Cl III 0 1865,202 Fe III 7 1848,231 Fe II 5 1864,743 Fe II 20 1848,144 Si I 200 1862,856 Ar II 1 1848,144 Si I 200 1862,749 Al III 10 1847,54 Na III 10 1862,57 N II 2 1847,468 Si I 400 1862,40 Na III 6 1846,581 Fe II 12 1862,34 Al II 15 1846,389 N I 6 1862,318 Fe I 15 1846,103 Si I 100 1861,3 Cs 0 1845,80 N III 4 1860,50 Ca III 3 1845,7 N II - 1860,37 N V 6 1845,64 N III 5 1860,040 Fe II 20 1845,510 Si I 300	1872,45 1872,39 1872,359 1872,214 1871,152 1870,782 1870,28 1870,227 1869,828 1869,43 1869,317 1868,660 1868,23 1868,21 1867,747 1866,815 1866,305	Na III Ca III Fe I Fe III Fe III Si II Ca III Si II Fe III Na III Si II Ar II Mg III N II Cu III Fe I Fe I Fe III	1 5 15 6 9 3 6 15 10 1 20 3 1 0 50 10 9	1853,148 1852,677 1852,464 1852,11 1851,791 1851,261 1850,668 1850,39 1850,24 1849,64 1849,58 1849,51 1849,41 1849,407 1848,90 1848,768	Si I Fe III Si I Cl III Si I Fe III Ca II Si I Na III Na III Cl III Na III Ca III Na III Fe III Al II Fe II	50 6 200 2 30 6 2 500 48 20 0 35 2 1 7 2	
wa .	1866,07 1865,202 1864,743 1862,856 1862,749 1862,57 1862,40 1862,34 1862,318 1861,3 1861,19 1860,50 1860,37	Fe I Fe III Fe II Ar II Al III N II Na III Al II Fe I Cs Na III Ca III N V	12 7 20 1 10 2 6 15 15 0 15 3 6	1848,74 1848,231 1848,144 1848,1 1847,54 1847,468 1846,581 1846,399 1846,103 1845,80 1845,7 1845,64	Cl III Fe II Si I N II Na III Si I Fe II N I Si I N I Si I N I Si I N III N III	0 5 200 0 10 400 12 6 100 4	

λ	Symbol	I	λ	Symbol	I
λ 1845,521 1845,10 1844,590 1844,547 1844,4 1844,36 1843,9 1843,765 1843,5 1843,43 1843,49 1843,088 1842,547 1842,4 1841,701 1841,68 1841,440 1841,146 1841,1 1840,917 1840,6 1840,917 1840,6 1840,917 1840,6 1840,917 1840,6 1849,59 1839,59 1839,43 1838,32 1838,309 1838,32 1838,311 1838,008 1838,71 1838,008 1838,71 1838,008 1837,1 1838,008 1837,1 1836,97 1836,739 1836,739 1836,506 1837,1 1836,97 1836,739 1836,506 1837,1 1836,97 1836,739 1836,506 1837,1 1836,97 1836,739 1836,506 1837,1 1836,97 1836,739 1836,506 1837,1 1836,97 1836,739 1836,506 1837,1 1836,739 1836,506 1837,1 1836,739 1836,506 1837,1 1836,739 1836,506 1837,1 1836,739	Fe III Na III Fe II Fe III Na III K II Na III K Si I N II Na III Ca II Si III N II Fe II N III Cu III Cs K Ca II Al II N III Ar III Mg III Fe III N III Ca II Si I N III Ca II N III Na III	7 12 5 6 10 20 2 2 200 0 2 2 4 9 1 10 1 200 100 200 2 8 2 2 8 2 2 3 1 7 1 6 7 30 2 1 4 200 5 1 15 6 15 6	1828,14 1827,97 1826,477 1826,339 1825,858 1825,55 1825,44 1825,30 1824,59 1824,52 1823,207 1822,72 1822,50 1822,452 1821,68 1820,47 1820,339 1819,845 1819,29 1819,01 1818,55 1817,73 1817,445 1817,334 1817,381 1817,381 1817,381 1817,381 1817,384 1817,384 1817,385 1814,647 1814,647 1814,647 1814,647 1814,647 1814,668 1813,772 1813,009 1812,53 1812,17 1811,62 1811,09	Ti III Mg I Xe III Cu III Ye III Fe IV Na III Cu I Ti III Cl III Na III Ar II Fe IV Cl III Si I Na III Xe III Fe IV III Cu III Si II Xe III Fe IV Ca III Si II Xe III Fe IV Ca II Cu I C	1 1 8 7 10 3 8 10 100 0 3 0 1 2 6 50 12 1 5 6 1 2 1 4 10 2 2 2 1 4 10 2 2 2 1 1 3 5 6 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1
1834,254 1834,039 1833,31 1832,87 1832,21 1832,08	Xe III Ar II Cl III Al II Ti III Cl III	4 2 4 8 0 4	1811,08 1810,74 1810,26 1809,316 1809,092 1808,51 1808,003	N V Na III Cl III Fe II Si I Cl III Si II	4 1 10 50 4 150
1831 ,78 1831 ,525 1831 ,31 1830 ,771 1830 ,458 1829 ,893 1829 ,42	N II Ar II Ti III Ar II N II Si I Ti III	5 5 0 5 4 20 0	1807,91 1807,84 1807,40 1807,337 1805,5 1804,3 1804,109 1803,023	Ca III Cu II Al II Ca II N III N III Xe III Si III Fe IV	5 15 4 1 7 6 2 3 5
1828,61 1828,43 1828,40	Al II Ca III Cl III	10 1 5	1801,53 1801,27 1800,95	Na III Cu II	7 2

λ	Symbol	I	λ	Symbol	1
1800,75 1800,24 1799,122 1798,761 1798,163 1797,98 1797,69 1797,343 1797,10 1794,68 1794,31 1793,371 1792,56 1791,91 1791,80 1791,561 1791,50 1791,23 1790,65 1790,292 1788,86 1788,101 1788,05 1787,997 1787,902 1787,538 1787,4 1787,4 1787,4	Mg III Ca III Si I Cu III Fe II Cl III Ti III Si I Ti III Mg III Ti III Ca III Fe II Ti III Cl II Na III Na III Cu II Si I Ti III Cu II Si I Ti III Ar II Mg III Fe II Cu III Si II Fe II Cu III Si II Fe II Cu III Si II K	1 4 4 100 5 10 2 1 15 0 3 4 10 2 4 8 1 10 5 20 1 3 1 35 1 8 4 4 2 3	1772,01 1771,829 1770,922 1770,8 1770,652 1770,652 1770,554 1769,762 1769,140 1768,869 1768,042 1767,76 1767,24 1767,24 1767,21 1766,385 1766,346 1766,346 1766,08 1766,08 1766,08 1765,636 1765,636 1765,636 1765,4 1765,4 1765,13 1765,030 1764,540 1764,01	Cl II Ar II Si I K Na Ar II Si I Fe III Si I Cu III AI II Cl II Na III AI I Si I Cu III N II Si I Cu III N II Si I Al II Si I Al II Al II Si I Al II	3 2 100 6 6 1 30 6 15 4 200 1 7 1 0 4 20 2 1 30 4 20 4 20 4 20 1 1 30 4 20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1787,10 1786,817 1786,738 1785,669 1785,669 1785,262 1785,06 1784,36 1783,935 1783,799 1783,58 1783,36 1783,36 1783,232 1782,92 1782,587 1780,062 1776,670 1776,436 1776,436 1775,983 1775,32 1774,820 1773,697 1773,5 1773,29 1773,00 1773,00 1773,00 1772,518 1772,478	Cl II Si II Fe II Ar II Fe II Cl II Ti III Cu III Cu III Ti III Mg III Si I Na III Ar II Cu III Fe III Ku III Ku III Fe III Ku III	3 4 40 1 40 1 1 5 4 20 1 4 50 12 1 5 100 1 20 6 0 200 1 6 3 3 0 15 2 15 2 16 16 16 16 16 16 16 16 16 16	1764,0 1763,93 1763,909 1763,85 1763,84 1763,664 1763,63 1762,899 1762,557 1762,14 1762,13 1762,00 1761,379 1761,155 1761,05 1760,81 1760,586 1760,40 1760,40 1760,15 1759,601 1758,01 1757,223 1756,0 1755,810 1755,012 1753,474 1753,27 1753,112	K II Mg III C I AI II Na III Si I N II Cu III Ca III Na III Fe II Cu III Cu III Fe II C II I II I II I II I II I II I II	0 2 2 8 3 50 2 2 30 3 0 5 25 20 1 3 10 20 4 7 20 1 1 5 1 20 60 15 3

λ	Symbol	I	λ	Symbol	I
1752,65 1752,4 1752,06 1751,827 1751,75 1751,679 1751,24 1750,749 1750,664 1750,56 1750,391 1750,079 1749,3 1749,3 1749,3 1747,81 1747,81 1747,40 1747,40 1747,40 1747,40 1746,816 1746,39 1745,57 1745,332 1745,57 1745,332 1744,64 1744,64 1744,64 1744,64 1744,64 1744,64 1744,61 1744,08 1744,08 1743,884 1743,197 1742,724 1741,574 1741,378 1741,33 1741,2 1741,135	Na III K Na III C I N III Ar II N III Xe III Mg II AI II Cu III N I K Na Cu I Mg III N III Mg II N III F II Si I Fe II Na III F II Si I F II Cu III N I Cu III	3 4 1 8 10 2 6 2 50 6 500 2 8 8 8 2 5 9 5 4 3 3 50 20 0 2 15 30 1 3 20 0 30 10 10 10 10 10 10 10 10 10 10 10 10 10	1732,69 1732,674 1732,674 1732,253 1731,88 1731,32 1731,08 1731,08 1730,81 1730,576 1730,04 1729,997 1729,481 1729,262 1729,075 1728,170 1728,139 1727,377 1726,88 1726,394 1726,275 1726,006 1725,664 1725,402 1725,138 1725,01 1725,0 1724,963 1724,847 1724,847 1724,847 1724,847 1724,847 1722,379 1722,21 1722,10 1721,66 1721,666 1721,666 1721,667 1721,66	Ne II Cu I Fe II Mg III Cu I Na III Fe II Mg III Cu I N III Si IV N I Ar II Ar II Si IV Cu III Si IV Cu III Fe II Cu III Fe II Cu III Si IV Cu I Fe II Ar III	1 20 15 1 2 0 10 10 8 5 1 1 1 3 200 5 1 1 15 3 8 8 10 6 1000 0 0 2 3 2 1 3
1740 ,378 1740 ,309 1739 ,64 1739 ,56 1739 ,508 1739 ,4	Si I N II Al II Mg III Cu III K	$egin{array}{c} 20 \\ 4 \\ 5 \\ 0 \\ 300 \\ 2 \\ \end{array}$	1721 ,31 1720 ,99 1720 ,621 1720 ,44 1720 ,042	Al II C II Fe II C II Fe II K	10 1 20 0 10
1738,91 1738,648 1738,56 1738,145 1737,893	Mg III Cu III Ca III Cu III Cu III Mg II	6 10 3 30 30 10	1719,60 1719,43 1719,346 1718,680	Na III Al II Ar II Ar II N IV	0 8 2 1
1737,628 1737,612 1736,830 1736,54 1734,852 1734,769	Mg II Mg II Ar II Cu II Mg II Si I	10 1 1 10 10 10	1718,48 1717,72 1717,134 1716,400 1716,23 1715,507	Na III Cu II Cu III Cu III Cu III Fe II	0 15 5 10 1 1
1734 ,21 1733 ,362 1732 ,998	Cu II Ar II Cu III	3 1 5	1713,307 1715,24 1714,85 1713,364	Ti III Mg III Cu I	0 0 50

					
λ	Symbol	I	λ	Symbol	I
1677 ,373 1676 ,818 1676 ,469 1675 ,920	Cu III Si I Cu III N II	200 10 15 1	1662,26 1662,253 1661,059	Fe IV Ar II Si II	20 1 3
1675 ,78 1675 ,76 1675 ,744	Fe IV Mg III N II	$\begin{array}{c} 2\overline{5} \\ 0 \\ 4 \end{array}$	1660 ,887 1660 ,484 1660 ,07 1660 ,0009	Cu III Si I Fe IV Cu II	$egin{array}{c} 30 \\ 10 \\ 20 \\ 20 \end{array}$
1675, 637 1675, 5 1675, 484 1675, 198	Ar III Cs Ar III Si I	4 1 7 200	1659,809 1659,7 1659,487 1659,28	Kr III K Fe II Mg III	$\begin{array}{c} 2 \\ 4 \\ 20 \\ 0 \end{array}$
1675 ,1 1674 ,89 1674 ,716 1674 ,602	K Fe IV Fe II Cu III	2 5 10 500	1658 ,92 1658 ,785 1658 ,71	Mg IV Fe II Na III	0 15 2
1673 ,860 1673 ,470 1673 ,440	Ca II Fe II Cu I	1 15 5	1658,7 1658,472 1658,121 1657,907	Na Cu III C I C I	$\begin{array}{c} 40 \\ 200 \\ 5 \\ 4 \end{array}$
1673 ,425 1673 ,374 1673 ,315 1673 ,241	Ar III Si IV Si III Ar III	7 150 7 3	1657,379 1657,008 1656,930 1656,61	C I C I C I Fe IV	2 10 3 15
1673 ,2 1673 ,14 1672 ,9	Cs Ar III K	1 1 3	1656,3216 1656,268 1656.25	Cu II C I Fe IV	20 5 10
1672 ,77 1672 ,593 1672 ,18 1671 ,886 1671 ,484	Cu II Si I Fe IV Cu III Cu I	10 100 5 500 3	1655,922 1655,318 1654,574 1654,484 1654,105	NV Cu I Cu III Fe II Fe II	$\begin{array}{c} 1\\ 30\\ 300\\ 5\\ 5\end{array}$
1671 ,111 1671 ,020 1670 ,81 1670 ,759	Si I N I Al II Fe II	$egin{array}{c} 20 \\ 1 \\ 15 \\ 25 \end{array}$	1653,9 1653,399 1653,351	Li II Cu III Si I	8 10 30
1670 ,140 1669 ,73 1669 ,671	Cu III Fe IV Ar III	500 2 7	1653,322 1652,85 1652,26 1652,010 1651,991	Ar II Fe IV Mg III Cu III Ca II	20 0 300 1
1669 ,52 1669 ,5 1669 ,304 1669 ,3	Na III Cs Ar III K	3 1 5 4	1651 ,758 1651 ,721 1651 ,21	Cu III Cu I Cl IV	15 20 1
1669 ,3 1669 ,273 1669 ,10 1668 ,7	Na Cu III Ar III K	40 10 1 4	1651,013 1650,91 1650,709	Si I Na III Fe II	20 1 20
1668 ,7 1668 ,57 1668 ,517	Na Mg I Si I	40 0 100	1650 ,531 1650 ,301 1650 ,119 1649 ,858	Ar II Cu I Cu I Ca II	1 5 5 2
1667 ,7 1667 ,618 1666 ,369	Ca Si I Si I	30 100 50 10	1649 ,583 1649 ,4573 1649 ,444 1649 ,299	Fe II Cu II Fe II Ar II	20 25 15 1
1664,708 1664,521 1664,303 1663,52	Cu I Si I Cu I Fe IV	30 10 10	1648,88 1648,04 1647,493	Mg III Cl IV N I	0 0 3
1663 ,266 1663 ,21 1663 ,0017	Fe II Fe IV Cu II	15 10 30	1647,359 1647,161 1647,05	Kr III Fe II Fe IV	2 25 45

λ	Symbol	I	a	Symbol	I
1646 ,187	Fe II	20	1626 ,411	Cu III	200
1645,06	C III Al II	1 5	1626 ,139	Cu III	200
1644 ,78 1644 ,441	Ca II	0	919, 1625, 919 1625, 707	Fe II Si I	15 30
1644 ,15	Al II	5	1625,707	Al II	3
1643 ,770 1643 ,588	Ca II Fe II	- 15	1625,534 1625,525	Si I Fe II	15 20
1643,40	Cl IV	1	1625,525	Cu III	1
1642,86 1642,802	Mg III Ca II	1	1624,07	Na III Cu II	$\begin{array}{c} 12 \\ 30 \end{array}$
1642,208	Ca II Cu III	2000	1623,17 1623,102	Fe II	8
1642, 187	Fe II	5	1622 ,867	Si I	100
1642,168 1641,761	Si IV Fe II	$\frac{4}{25}$	1622,86 1622,44	Cl IV Cu II	$\frac{2}{40}$
1640,496	He II	1	1621,966	ΝV	1
1640,474	Cu I	5	1621,94 1621,723	Na III Cu III	5 3
1640 ,474 1640 ,437	He II N I	$\frac{10}{2}$	1621 ,685	Fe II	30
1640,335	Ar II	1	1621 ,4256 1621 ,316	Cu II Cu I	$\begin{array}{c} 60 \\ 20 \end{array}$
1640,332	He II	5	1620,776	Cu III	1
1640 ,257 1640 ,167	Si I Fe II	$\frac{20}{12}$	1620,68 1620,389	C III Si I	$\frac{1}{20}$
1640,03	Fe IV	65			
1639 ,960 1639 ,403	Cu III Fe II	10 30	1620,33 1620,05	C III C III	$\frac{2}{3}$
1639,00	Al IV	$\frac{3}{2}$	1619.688 1619,531	N V Si I	12 10
1638,956	Cu III	300	1618,464	Fe II	25
1638, 95 1638, 816	Cl IV Kr III	$\begin{bmatrix} 0 \\ 3 \end{bmatrix}$	1618,408 1618,38	Cu III Al II	5 4
1638,274	Si I	10	1617,9151	Cu II	20
1637,400	Fe II	15	1617 ,43 1616 ,972	Cl IV Ar II	1
1636 ,61 1636 ,334	Cu II Fe II	10 30	1616,940	Cu I	$2\overline{0}$
1635,389	Fe II Si IV	35 1	1616,607	Cu III	300
1634 ,60 7 1634 ,353	Fe II	$\frac{1}{20}$	1616,571 1616,41	Si I Al II	$\frac{20}{4}$
978, 1633	Si I	50	1616,328	ΝV	9
1633,907 1633,64	Fe II Na III	15 4	1616 ,160 1616 ,06	Cu III N II	15 1
1633,318	Si I	15	1615,93 7	Si I	20
1633,192	Cu III	1	1614,650 1614,557	Si I Si I	10 10
1633, 203 1632, 326	Si I Cu I	15 5	1613 ,77 1612 ,814	Na III Fe II	8
1631,124	Fe II	30	-		20
1631,134	Si I	7 5	1611,849 1611,763	Al III Fe III	8 7
1630,99	Fe IV	7 5	1611,723	Fe III	7
1630,2 7 1629,921	Cu II Si I	$\begin{array}{c} 25 \\ 200 \end{array}$	1611,1180 1610,97	Cu II Na III	$\begin{array}{c} 10 \\ 4 \end{array}$
1629 ,834 1629 ,830	Ar II N II	1 4	1610 ,933	Fe II	15
·			1610,571	Cu III	7 5
426, 426 1629, 301	Si I Cu III	300	1610 ,2964 1609 , 7 57	Cu II Cu III	15 100
1629,155	Fe II	30	1609,599	Cu III	50
1629 ,02 1628 ,825	N II Ar II	1	1608,900	Si I	10
1628,295	Cu III	300	1608,6396	Cu II	25
1628,088	Cu III	50	1608,446 1607,723	Fe II Fe III	35 9
1627,42	N II	1	1607,542	Cu III	100

A Symbol I A Symbol I						
4666,927	λ	Symbol	I	λ	Symbol	I
4666,927	1607 168	ArII	1	1589 463	Ar II	5
1606,837 Cu III 10 1588,950 Si III 2 1606,730 Cu III 300 1588,551 Cu III 3 1606,730 Cu III 300 1588,255 Fe II 10 1606,969 Cu III 300 1588,255 Fe II 10 1605,976 A1 III 8 1586,266 Mg III 3 1605,776 A1 III 8 1586,266 Mg III 3 1605,274 Cu II 30 1586,26 Ar II 2 1604,8474 Cu II 20 1588,133 Si I 5 1604,8474 Cu II 20 1588,133 Si I 5 1604,083 Ar II 5 1588,133 Si I 5 1603,443 Ar II 4 1584,45 Ar III 2 1603,443 Ar II 4 1584,45 Ar III 2 1603,074 Ar II 4 1584,45 Ar III 2 1602,973 N I 1 1583,799 Cu I 15 1602,971 C I 5 1583,683 Cu II 50 1602,91 Na III 5 1583,683 Cu II 50 1602,588 Fe II 12 1582,04 Al IV 3 1602,588 Fe II 12 1582,04 Al IV 3 1602,584 Ar II 2 1581,991 Cu III 40 1602,250 Cu II 40 1580,760 Ar II 4 1602,250 Cu II 40 1580,660 Ar II 4 1600,434 Ar II 6 1580,960 Ar II 1 1 1 1 1 1 1 1 1						
1506, 130	1606 ,837			11	Si III	2
1606, 197				1588 ,551	Cu III	3
1605 969	•					
1605 776						
1604, 3474 Cu II 30	1605,776	Al III	8	<u> </u>	_	
1604,47						4
1604 083	•					
4603, 446 Cu III 400 1584, 475 Al II 2 1603, 446 Cu III 400 1584, 455 Al IV 2 2 1602, 973 N I 1 1 1583, 83 Ar II 1 1 1 1 1 1 1 1						
1603,074	1603,443	Ar II	4	1		
1583,83						$\frac{2}{2}$
1602,971				1583 ,83		
1602 91			1 5			
1602, 588 Fe II 12 1582, 04 Al IV 3 1580, 2584 Ar II 2 1581, 243 Fe II 8 1602, 3882 Cu II 40 1580, 960 Ar II 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			5	11		
1002,358						
1602 3882				1581 ,991		
1602						
1601, 211			15			_
1580,694	1601,289					$\frac{2}{2}$
1600 194						25
1600,133						
1599,597	1600,134			1580,303	51 1	
1599, 125	597, 1599	Ar II				
1599,125						ა 5
1598,724				1579 ,498	Xe III	5
1598,561 Ar II 1 1579,353 Cu III 15 1598,4024 Cu II 40 1578,812 Ar II 3 1597,950 Si I 30 1577,89 C III 2 1597,418 Cu III 10 1577,32 C III 2 1597,181 N I 2 1577,131 N I 1 1596,141 Ar II 1 1576,897 Ar II 3 1596,02 Al II 3 1576,897 Ar II 3 1595,760 Si I 20 1576,897 Ar II 3 1595,734 Ar II 1 1576,897 Ar II 3 1595,597 Fe III 6 1575,349 Cu II 5 1594,927 Si I 50 1575,115 Si I 20 1594,548 Si I 150 1574,992 Ar II 6 1593,758 Cu III 1000 1574,68 Fe IV 8 1593				1579 ,492	Cu II	30
1597,950 Si I 30 1577,89 C III 2 1597,418 Cu III 40 1577,32 C III 2 1597,181 N I 2 1577,131 N I 1 1596,141 Ar II 1 1576,897 Ar II 3 1595,760 Si I 20 1576,49 C III 3 1595,734 Ar II 1 1575,815 Ar II 3 1595,797 Fe III 6 1575,349 Cu II 5 1595,797 Fe III 6 1575,349 Cu II 5 1595,797 Fe III 6 1575,349 Cu II 5 1594,992 Si I 50 1575,115 Si I 20 1594,548 Si I 150 1574,992 Ar II 6 1593,758 Cu III 100 1574,817 Si I 50 1593,5557 Cu II 60 1574,402 Ar II 1 1592	1598,561	Ar II				
1597,418				1578,812		
1597,418						2
1596,141 Ar II 1 1576,897 Ar II 3 1596,02 Al II 3 1576,897 Ar II 15 1595,760 Si I 20 1576,49 C III 3 1595,734 Ar II 1 1576,49 C III 3 1595,597 Fe III 6 1575,815 Ar II 3 1595,24 Ca III 1 1575,349 Cu II 5 1594,927 Si I 50 1574,992 Ar II 6 1594,548 Si I 150 1574,992 Ar II 6 1594,548 Si I 150 1574,992 Ar II 20 1593,758 Cu III 100 1574,817 Si I 50 1593,581 Ar II 2 1574,88 Fe IV 8 1593,587 Cu II 60 1574,402 Ar II 1 1592,409 Si I 50 1573,831 Fe II 5 1592,39 Mg III 1 1573,650 Si I 20 1591,48<						1
1596,02 AI II 3 1576,817 Si I 15 1595,760 Si I 20 1576,49 C III 3 1595,734 Ar II 1 1 1575,815 Ar II 3 1595,597 Fe III 6 1575,349 Cu II 5 1594,927 Si I 50 1574,992 Ar II 6 1594,548 Si I 150 1574,992 Ar II 6 1594,787 Ar II 1 1 1594,817 Si I 50 1593,758 Cu III 1000 1574,817 Si I 50 1593,5557 Cu II 60 1574,402 Ar II 1 1 1593,5557 Cu II 60 1574,402 Ar II 1 1 1573,874 Si I 50 1592,409 Si I 50 1573,831 Fe II 5 1592,409 Si I 50 1573,650 Si I 20 1592,39 Mg III 1 1 1591,933 Ar II 1 1 1591,933 Ar II 1 1 1591,933 Ar II 1 1 1591,48 C III 2 1572,72 Mg III 1 1 1590,229 Ar II 2 1571,390 Cu III 1 1 1590,229 Ar II 2 1571,390 Cu III 1 1 1590,229 Ar II 2 1571,390 Ar II 1 1	1596 ,141		1	1576 ,897	Ar II	3
1595,734 Ar II 1 1575,815 Ar II 3 1595,597 Fe III 6 1575,349 Cu II 5 1595,597 Fe III 6 1575,349 Cu II 5 1594,548 Si I 50 1574,992 Ar II 6 1594,787 Ar II 1 1574,992 Ar II 20 1593,758 Cu III 1000 1574,817 Si I 50 1593,581 Ar II 2 1574,402 Ar II 1 1593,5557 Cu II 60 1574,402 Ar II 1 1592,867 N I 3 1573,874 Si I 50 1592,409 Si I 50 1573,650 Si I 50 1592,39 Mg III 1 1573,21 N II 1 1591,933 Ar II 1 1572,72 Mg III 4 1590,25 N II 2 1571,390 Ar II 1 1590,229 Ar II 2 1571,390 Ar II 1 1590,229 </td <td></td> <td></td> <td></td> <td>1576,817</td> <td></td> <td>15</td>				1576,817		15
1595,597 Fe III 6 1575,349 Cu II 5 1595,24 Ca III 1 1 1575,115 Si I 20 1574,992 Ar II 6 1594,927 Si I 150 1574,992 Ar II 20 1594,787 Ar II 1 1 1574,817 Si I 50 1593,758 Cu III 1000 1574,68 Fe IV 8 1593,5557 Cu II 60 1574,402 Ar II 1 1573,874 Si I 50 1592,409 Si I 50 1573,831 Fe II 5 1592,409 Si I 50 1573,650 Si I 20 1592,39 Mg III 1 1591,933 Ar II 1 1591,933 Ar II 1 1591,48 C III 2 1572,72 Mg III 1 1590,229 Ar II 2 1571,390 Ar II 1 1590,229 Ar II 2 1571,390 Ar II 1						ა ვ
1595, 24 Ca III 1 1594, 927 Si I 50 1594, 548 Si I 150 1594, 787 Ar II 1 1593, 758 Cu III 1000 1593, 581 Ar II 2 1593, 5557 Cu II 60 1592, 867 N I 3 1592, 409 Si I 50 1592, 39 Mg III 1 1591, 933 Ar II 1 1591, 48 C III 2 1590, 25 N II 2 1590, 229 Ar II 2 1571, 390 Ar II 1 1572, 72 Mg III 1 1590, 229 Ar II 2 1571, 390 Ar II 1 1571, 390 Ar II <td< td=""><td></td><td></td><td></td><td></td><td></td><td>5</td></td<>						5
1594,548 Si I 150 1574,992 Ar II 6 1594,787 Ar II 1 1000 1574,68 Fe IV 8 1593,758 Cu III 1000 1574,68 Fe IV 8 1593,5557 Cu II 60 1574,402 Ar II 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1595 ,24			1575 .115	Si I	20
1594,787	1594,927			1574,992	Ar II	6
1593,758						
1593,581 Ar II 2 1593,5557 Cu II 60 1574,402 Ar II 1 1573,874 Si I 50 1592,867 N I 3 1573,831 Fe II 5 1592,409 Si I 50 1573,650 Si I 20 1592,39 Mg III 1 1573,21 N II 1 1591,933 Ar II 1 1573,21 N II 1 1591,48 C III 2 1572,72 Mg III 4 1590,25 N II 2 1571,390 Cu III 1 1590,229 Ar II 2 1571,390 Ar II 1						
1593 ,5557 Cu II 60 1573 ,874 Si I 50 1592 ,867 N I 3 1573 ,831 Fe II 5 1592 ,409 Si I 50 1573 ,650 Si I 20 1592 ,39 Mg III 1 1591 ,933 Ar II 1 1591 ,48 C III 2 1572 ,72 Mg III 1 1590 ,25 N II 2 1571 ,390 Cu III 1 1590 ,229 Ar II 2 1571 ,390 Ar II 1	1593 ,581	Ar II	2	1		1
1592,867 N I 3 1573,831 Fe II 5 1592,409 Si I 50 1573,650 Si I 20 1592,39 Mg III 1 1573,21 N II 1 1591,933 Ar II 1 1591,48 C III 2 1572,72 Mg III 1 1590,25 N II 2 1571,390 Cu III 1 1590,229 Ar II 2 1571,390 Ar II 1 1 1		Cu II	60		Si I	50
1592,409 Si I 50 1573,650 Si I 20 1592,39 Mg III 1 1591,933 Ar II 1 1591,48 C III 2 1572,72 Mg III 1 1590,25 N II 2 1571,390 Cu III 1 1590,229 Ar II 2 1571,390 Ar II 1	1592 ,867			1573 ,831	Fe II	5
1591 ,933	1592 ,409					
1591,48 C III 2 1572,97 Al II 3 1590,25 N II 2 1571,390 Cu III 1 1590,229 Ar II 2 1571,390 Ar II 1		Mg III Ar II		ll .		
1590 ,25 N II 2 1571 ,390 Cu III 1 1 1590 ,229 Ar II 2 1571 ,390 Ar II 1						
1590,229 Ar II 2 1571,390 Ar II 1	1590.25	N II	2		Cu III	1
1590,1646 Cu II 40 15/1,377 51 I	1590 ,229	Ar II	2	1571,390		
	1590 ,1646	Cu II	40	# 15/1,3//	21 1	10

λ	Symbol	I	λ	Symbol	I
1571 ,31	Ca III	5	1558 ,543	Fe II	10
1571 ,21	Fe IV	10	1558 ,3446	Cu II	30
1571 ,154 1570 ,568 1570 ,248	Cu III Cu II Fe II	3 3 20	1558 ,05 1557 ,583	Cl II Cu II	$\begin{smallmatrix}1\\20\end{smallmatrix}$
1570 ,202	Cu III	$\begin{array}{c} 30 \\ 2 \\ 2 \end{array}$	1557 ,302	Ar II	1
1570 ,035	Cu II		1557 ,24	Al IV	5
1569 ,886	Kr III		1556 ,48	Fe IV	15
4569 ,670	Fe II	12	1555,698	Cu II	50
1569 ,426	Cu II	10	1555,48	Ca III	4
1569 ,35	Al II	1	1555,134	Cu II	40
1569 ,322	Si I	10	1555 ,01	Fe IV	1
1569 ,2123	Cu II	10	1554 ,642	Ca II	4
1568 ,655	Cu III	2	1554 ,438	Xe III	1
1568,564	Cu III	2	1554 ,17	Fe V	$\begin{array}{c}1\\25\\4\end{array}$
1568,172	Si I	15	1553 ,893	Cu II	
1568,031	Fe II	8	1553 ,176	Ca II	
1567,987	Ar II	4	1553,00	Al IV	1
1567,703	Si I	10	1552,641	Cu II	50
1566,825	Fe II	20	1552,11	Fe IV	15
1566 ,812	Ar II	1	1551 ,379	Cu II	30
1566 ,54	Fe IV	3	1551 ,27	Cl IV	1
1566 ,4151	Cu II	40	1550 ,862	Fe III	8
1565 ,9240	Cu II	40	1550 ,80	Fe V	2
1565 ,377	Ar II	1	1550 ,771	C IV	19
1565 ,194	Cu III	5	1550 ,644	Cu II	30
1565,05 1564,589 1564,14	Fe IV Si I Al IV	2 10 1 5	1550 ,292 1550 ,196 1549 ,975	Cu II Fe III Xe III	$\begin{array}{c} 3\\12\\2\end{array}$
1564,066 1563,790 1563,765	Si II Fe II Si II	$\begin{array}{c} 25 \\ 10 \end{array}$	1549,336 1549,203 1549,15 1548,867	N V Cu III Cl IV Cu III	$\begin{array}{c} 6 \\ 10 \\ 2 \\ 300 \end{array}$
1563,56	Al II	1	1548 ,68	Na III	8 20
1563,30	Fe IV	10	1548 ,185	C IV	
1563,189	Cu II	5	1548	N V	
1563,036 1562,845 1562,563 1562,50	Ar II Si II Xe III Ca III	$egin{array}{c} 1 \\ 15 \\ 4 \\ 6 \end{array}$	1547,950 1547,58 1547,354	Cu II Fe IV Ar II	10 15 1
1562,451	Si II	10	1546,03	Fe IV	$\begin{matrix} 8\\3\\2\\2\end{matrix}$
1562,441	Ar II	2	1545,7	Ca	
1561,982	Si I	10	1545,19	Cl IV	
1561,792 1561,790 1561,435	Si I Cu III C I	$\frac{10}{10} \\ 3}{20}$	1544 ,711 1544 ,674 1544 ,50	Ar II Cu II Fe V	$\frac{40}{3}$
1561,337 1560,739 1560,691	C I Si I C I	5 15 15	1544 ,177 1544 ,110 1544 ,062 1543 ,66	Ar II Cu III Cu III	2 2 2
1560,35 1560,306	Al II C I	8	1543 ,438 1543 ,180	Fe V Cu III Cu III	500 2
1560 ,26 1560 ,184 1560 ,067 1559 ,106	Fe IV Ar II Si I Fe II	15 4 15 20	1542,562 1542,499 1542,177	Cu III N I C I	$egin{array}{c} 2 \\ 1 \\ 2 \end{array}$
1559 ,08 1559 ,0 72	Fe IV Ar II	15 3	1542 ,15 1541 ,970 1541 ,7031	Fe IV Cu III Cu II	15 40 75
1558,802	Kr III	3	1541 ,19	Na III	1 1
1558,706	Fe II	10	1540 , 77	Fe IV	

λ	Symbol	1	λ	Symbol	I
1540 ,589 1540 ,3889 1540 ,231 1539 ,74	Cu II Cu II Cu II Al II	30 30 20 10	1512 ,457 1512 ,174 1512 ,072 1511 ,121	Cu II Cu II Si II Xe III	20 20 50 3
1539 ,30 1539 ,128 1538 ,67	Cl IV Fe III Fe IV	$2 \\ 8 \\ 25$	1510 ,924 1510 ,502 1509 ,454	CI Cu II Xe III	1 35 2
1538,632 1538,488 1537,560	Fe III Cu II Cu II	10 10 50	1509 ,101 1508 ,82 1508 ,741	Si II Mg IV Si II	100 0 3
1537,52 1537,21 1535,515	Al IV Cl IV Cu II	2 3 15	1508,627 1508,175 1506,94	Cu II Cu II Ca III	$ \begin{array}{r} 30 \\ 25 \\ 3 \end{array} $
1535 ,0024 1533 ,976 1533 ,445	Cu II Cu II Si II	$ \begin{array}{r} 25 \\ 25 \\ \hline 1000 \end{array} $	1506,07 1506,060 1505,848	Ti III Si III Cu II	10 6 5
1533 ,27 1533 ,25 1532 ,70 1532 ,124	Fe V Cl IV Fe V Cu II	2 1 4 30	1505 ,384 1505 ,166 1504 ,91	Cu II Fe III Ti III	20 10 5
1532 ,19 1531 ,864 1531 ,85	Cl IV Fe III C III	1 7 2	1504 ,755 1504 ,59 1503 ,368	Cu II Ti III Cu II	25 10 15
1531 ,8557 1531 ,644 1531 ,588	Cu II Fe III Cu III	50 8 1	1502,36 1502,107 1501,870	Ti III Cu III Si III Cu II	10 1 9 10
1531 ,293 1529 ,67 1529 ,28	Fe III Na III Cl IV	6 1 0	1501 ,333 1501 ,3 1501 ,191	Cs II Si III	5 10
1528 ,91 1528 ,89 1528 ,782	Cl II Ca III Cu II	$\begin{matrix} 1 \\ 0 \\ 2 \end{matrix}$	1500 ,241 1499 ,510 1499 ,17 1498 ,65	Si III Cu II Ti III Ti III	12 10 20 30
1527,801 1526,969 1526,719	Cu II Cu II Si II	5 5 500	1498 ,566 1496 ,92	Cu II Ca III	$\frac{3}{2}$
1526 ,15 1525 ,794 1525 ,653	Al IV Cu II Cu II	1 30 10	1496,6860 1496,59 1496,172 1495,5	Cu II Ti III Si III N V	35 1 7 2 25
1524 ,857 1524 ,67 1523 ,740	Cu II Fe IV Cu II	20 15 10	1495,426 1495,311 1495,08	Cu II Fe II Ti III N I	25 15 1 60
1522 ,580 1522 ,575 1520 ,546 1520 ,543	Cu III Cu II Cu III Cu II	15 15 20 20	1494,668 1494,658 1493,7	Cu II Li II	5 6
1519 ,8370 1519 ,4917	Cu II Cu II	60 50 5	1493,640 1493,359 1492,837 1492,817	Fe III Cu II Cu II N I	9 25 30 30
1518 ,221 1517 ,930 1517 ,6312	Si II Cu II Cu II	10 20	1492,684 1492,624	Cu II N I Cu II	10 80 10
1517, 162 1516, 910 1516, 902 1514, 492	Cu II Si II Cu II Cu II	10 60 5 50	1492 ,149 1491 ,98 1490 ,41 1488 ,6373	Ti III Mg IV Cu If	5 0 75
1514 ,492 1514 ,238 1513 ,570	Cu II Si II	10 30	1487,35 1486,904 1486,87	Fe IV Cu III Al IV	5 10 1
1513 ,533 1513 ,360	Si III Cu II	$\frac{2}{20}$	1486,659 1486,496	Cu III N I	25 2

	λ	Symbol	I	λ	Symbol	I	
	1486, 265 1485, 6777 1485, 513 1485, 48 1485, 318 1485, 224 1485, 024 1484, 92 1484, 873 1484, 010 1483, 831 1483, 429 1482, 890 1481, 762 1481, 762 1481, 762 1481, 763 1481, 243 1480, 880 1480, 55 1479, 65 1479, 49 1478, 30 1478, 30 1478, 004 1477, 997 1477, 68 1476, 054 1476, 054 1476, 054 1476, 000 1475, 846 1476, 054 1476, 054 1476, 054 1476, 054 1476, 054 1476, 054 1476, 331 1476, 537 1474, 539 1472, 399 1472, 231 1472, 13	Fe III Cu II Si II Fe IV Cu II Si II Si II Ca III Si II Cu III Cu III Kr III Mg II Cu III Mg II Cu III Mg II Cu III Mg II Cu III Fe IV Fe II Fe II Fe II Fe II Fe II Fe II Cu II Fe II To III Fe II Fe II Fe II Fe II Fe II Cu II Fe II Cu II Fe II Cu II Fe II The II Cu II Fe II The III The II T	7 40 100 100 12 20 30 90 4 15 5 15 2 7 4 20 0 20 20 20 38 4 1 2 2 38 4 1 2 2 38 5 20 15 1 20 0 35 2 1 40 0	1468,180 1468,11 1468,006 1467,841 1467,450 1467,384 1467,25 1466,751 1466,751 1466,524 1466,519 1466,519 1465,542 1465,542 1465,532 1465,532 1465,37 1465,153 1464,73 1464,73 1464,73 1464,776 1463,41 1463,336 1463,25 1463,35 1463,25 1463,155 1462,822 1462,67 1461,556 1460,915 1460,86 1460,234 1460,977 1459,92 1459,85 1459,87 1459,87 1459,87 1459,87 1459,85 1459,87 1459,85 1459,32 1459,412 1459,032 1458,15 1458,004 1457,253 1457,175 1456,23 1457,175	Xe III Fe IV Ar III Ar III C I N I Ti IV Cu II N I Ar III Cu II Ar III Cu II Ar III Fe V Ar II Cu II Fe IV Ar II Fe IV Ar II Cu II Fe IV Ar II Cu II Cu II Cu II Cu II Fe IV Ar II Cu II Cu II Fe IV Ar II Fe IV Ar II Fe IV Ar II Cu III Fe IV Ar III Fe IV	4 2 2 3 3 3 3 0 5 5 1 10 20 3 15 2 3 1 20 40 6 1 50 4 6 4 2 2 3 15 10 2 2 4 40 1 3 5 1 25 2 3 6 30 3 5 10 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
	1470,54 1470,082 1469,92 1469,691	Fe IV C I Fe IV Cu II	2 1 20 15	1455,665 1455,59 1455,484	Cu II Fe V Ar II	25 5 5 1	
	1469,691 1469,621 1469,21 1469,04 1468,410	Cu II Xe I Ti IV Fe IV C I	5 15 37 3	1455,484 1455,22 1455,200 1454,71 1453,67 1452,291	Ti III Cu III Fe V Fe IV Cu II	$egin{array}{c} 1 \\ 40 \\ 3 \\ 3 \\ 15 \\ 20 \\ \end{array}$	
007	•	=	- 1	- 100,001	GuII	20	

λ	Symbol	I	λ	Symbol	I
1451,879 1451,75 1451,478 1450,307 1450,29 1450,165 1449,70 1449,056 1448,91 1447,47 1447,496 1446,114 1445,982 1444,692 1444,1305 1443,541 1441,732 1440,95 1440,95 1440,46 1439,391 1439,094 1438,983 1438,983 1438,983 1438,983 1438,983 1438,983 1438,702 1438,37 1438,228 1437,645 1436,166 1435,776 1436,233 1436,21 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1435,776 1435,312 1436,166 1437,588 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85 1433,85	Ar II Ti IV Cu III Cu III Ti III Cu III Al IV Cu II Fe V Al IV Si III Cu II Cu II Cu II Cu II Cu II Cu II Si III Si III Si III Si III Si III Cu III Si III Cu III Si III Cu III Cu III Cu III Si III Cu III	1 30 1 25 23 0 20 6 2 6 5 20 1 2 10 15 1 5 0 7 3 2 10 2 4 2 3 2 3 15 4 1 15 12 7 8 10 25 15 2 10 6 1 1 3 4 2	1428,53 1428,366 1428,47 1428,081 1427,85 1427,835 1427,589 1427,27 1426,89 1426,78 1426,45 1425,079 1425,00 1424,775 1424,747 1424,020 1423,553 1423,553 1423,553 1423,504 1421,760 1421,760 1421,760 1421,760 1421,382 1420,89 1420,42 1420,89 1420,42 1420,89 1420,42 1420,04 1419,742 1418,811 1418,423 1417,781 1417,784 1417,58 1417,538 1417,538 1417,538 1417,538 1417,538 1417,538 1417,538 1417,600 1416,972 1416,972 1416,972 1416,478	C III Cu II Cu III Cu III Cu III Cu III Cu II Cu II Cu III Cu III Cu III Cu III Cu III Fe II Cu III Ti III Cu III Ti III Cu III Cu II Ti III Cu II Cu II Ti III Cu II Cu II Cu II Cu II Cu II Cu II Ti III Cu II Cu III	2 15 2 15 2 15 3 20 10 0 1 1 4 1 2 0 2 12 20 8 5 1 10 25 1 15 20 5 1 15 3 15 2 5 20 0 10 13 2 10 1 10 3 25 1 10 3 25 1 12
1431,93 1431,901 1431,671 1431,597 1430,969 1430,791 1430,61	Al IV Cu III Cu III C I Cu III Si IV Fe V	2 3 10 2 3 1 8	1412,834 1412,794 1412,724 1412,24 1411,939 1411,69	Fe II Cu III Cu III Al IV N I Cu N I	5 5 0 30 30 30
1430 ,373 1430 ,243 1429 ,201 1428 ,95	Cu III Cu III Cu III C III	3 40 5 1	1411,510 1410,950 1410,219 1409,52 1409,51	Si IV Si II Al IV Fe V	1 20 0 7

λ	Symbol	I	λ	Symbol	I
1409,248 1409,19 1409,073 1408,811 1408,536	Cu III Fe V Si II Cu II Cu III	1 6 10 2 1	1385,921 1385,39 1385,380 1385,32 1384,929 1384,840	Cu III Ca III Cu III Fe V Cu III Cu III	3 2 1 2 3 5
1408,19 1407,701 1407,196 1407,160 1407,139 1406,78 1404,72	Fe V Si IV Cu III Cu II Cu III Fe V Al IV	1 3 3 15 5 7 2	1384,75 1384,324 1384,17 1384,144 1382,765 1382,561	Fe V Cu III Fe V Al III Ar II Cu III	1 5 1 5 1 5
1404,478 1403,783 1403,763 1403,181 1402,917 1402,9 1402,776	Si II Si II Cu III Cu III Cu III Ca Cu II	6 5 1 10 1 10 15	1382,228 1381,250 1380,723 1380,18 1379,884 1379,670 1379,529 1379,379	Ar II Fe II Ar II Fe V Ar II Al III Cl I Cu III	2 10 1 2 3 3 11
1402,769 1402,45 1402,435 1402,250 1401,655 1401,602 1401,376	Si IV Fe V Cu III Cu III Cu III Cu III Cu III	12 6 3 5 5 2	1379,377 1378,238 1377,833 1377,504 1377,238 1377,211 1377,082	Ar II Cu III Kr III Cu III Si III Ar II Si III	1 1 2 30 2 4 3
1400,90 1400,7 1400,30 1399,355 1399,190 1398,636 1398,379	Kr III Ca Fe V Cu II Cu III Cu II Cu III	1 4 4 3 5 10 5	1376 ,956 1376 ,807 1376 ,45 1375 ,688 1375 ,621	Ar II Cu III Fe V Si III Cu III	1 30 6 2 5
1397,99 1397,581 1396,527 1396,417 1396,231 1395,274 1394,77	Fe V Fe II Cl I Cu III Ar II Cu III Fe V	3 12 8 1 1 10 3	1375 ,083 1374 ,758 1374 ,033 1373 ,68 1373 ,118 1373 ,030	Si III Cu III Cu III Fe V Cl I Si III	2 3 3 6 4 5
1393,755 1393,496 1393,4 1393,126 1390,306 1389,97	Si IV Xe III Ca Cu II Cu III Fe V Cl I	15 1 8 10 10 0 6	1372,899 1371,840 1371,652 1371,287 1371,26 1371,144	Cu III Cu II Si III O V Al II Cu III	5 20 3 10 2 10
1389,822 1389,688 1389,528 1389,514 1389,05 1388,77	N V Cl I Cu III N V Fe V Al IV Cu III	2 6 5 3 1 2	1371,00 1370,6 1370,558 1369,988 1369,612 1369,437 1369,423	Fe V Ca II Cu II Cu III Cu III Si III Mg II	4 3 2 1 5 5
1388,07 1387,994 1387,31 1386,714 1386,33	Fe V Si III N III Cu III Fe V	5 5 4 1 0	1369 ,1 1368 ,923 1367 ,952 1367 ,708 1367 ,646	Ca II Cu III Cu II Mg II Cu III	3 2 25 —

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λ	Symbol	I	λ	Symbol	I
1367,256 1367,049 1365,73 1365,544 1365,544 1365,253 1365,14 1364,165 1363,853 1363,72 1363,501 1363,459 1363,459 1363,449 1363,00 1362,771 1362,598 1362,366 1361,597 1361,42 1360,870 1360,735 1360,566 1359,935 1359,81 1359,49 1359,41 1359,329 1359,41 1359,329 1359,010 1358,764 1358,524 1358,524 1358,440 1357,28 1357,140 1356,424 1356,364 1355,887 1355,825 1355,605 1355,37	Mg II Si III Fe V Mg II Si III Fe V Fe II C I Kr III Fe V Cu II Si III Cl I Ar II Fe V Fe II Cu II Si III Si III Cu II Si III Si III Fe V Fe II Cu III Cu II Cu III	$\begin{bmatrix} -7 & 3 & 8 & 3 & 12 & 6 & 2 & 3 & 5 & 7 & 10 & 2 & 4 & 20 & 20 & 5 & 8 & 5 & 5 & 1 & 1 & 5 & 1 & 0 & 1 & 2 & 20 & 30 & 5 & 2 & 1 & 3 & 5 & 3 & 6 & 6 & 2 & 1 & 15 & 2 & 2 & 1 & 3 & 5 & 2 & 1 & 3 & 5 & 3 & 6 & 6 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 1 & 15 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & $	1348,745 1348,543 1348,077 1347,56 1347,238 1347,048 1346,44 1346,27 1346,062 1345,69 1345,330 1343,730 1343,507 1343,388 1343,338 1343,032 1342,995 1342,678 1342,535 1342,535 1342,193 1341,889 1341,465 1340,909 1339,769 1339,769 1339,769 1339,769 1339,769 1339,72 1339,497 1338,603 1337,572 1339,497 1338,603 1337,572 1337,39 1335,723 1335,684 1334,515 1334,515 1334,515 1333,054 1332,985 1332,985 1332,985 1332,985 1332,588 1329,588 1329,588	Ar II Si II Cu III N III Cl I Cu III N III O IV Si III N II Cu III O IV Kr III Ca II Si III Cu II Cu III	1 100 1 0 12 3 100 0 4 5 4 1 5 7 6 2 2 4 1 7 3 1 8 3 5 6 5 6 6 9 14 3 15 6 9 16 16 17 18 18 18 18 18 18 18 18 18 18 18 18 18
1354,292 1353,964 1353,73 1353,718 1352,92	C I Cu II I Al IV Si II Al III	5 2 0 100 1	1328,834 1328,416 1327,927 1327,60 1327,178	C I Cu II N I Ti III Cu III	5 3 5 10 15 5
1352,635 1351,837 1351,657 1351,330 1351,271 1350,658 1350,592	Si II Cu II Cl I Ar II Cu III Si II Cu II	100 25 10 1 3 20 15	1326,964 1326,572 1326,394 1325,685 1325,511 1324,40 1324,033	N IV N I Cu II N IV Cu II N III Cu III	0 15 10 1 3 3 5
1350,520 1350,520 1350,15 1350,057 1349,441	Si II Al II Si II Cu III	20 6 150 5	1 323,98 1 323,916 1 323,811 1 323,187 1 322,627	N IV C II Cu II Cu II Cu II	2 8 6 3 6

λ	Symbol	I	λ	Symbol	I
1321,788 1321,60 1320,83 1320,687 1319,684 1319,003 1318,582 1318,13 1317,60 1317,41 1316,287 1316,143 1315,903 1315,484 1315,23 1314,335 1314,147 1313,47 1313,47 1313,47 1313,47 1313,47 1313,47 1313,20 1312,86 1312,590 1312,44 1312,400 1312,261 1311,365 1310,588 1310,952 1310,646 1310,58 1311,365 1310,588 1310,558 1310,548 1310,557 1309,557 1309,463 1309,458 1309,458 1309,443 1309,30 1309,274 1308,86 1309,473 1308,296 1308,280 1307,875 1308,296 1308,280 1307,875 1306,714 1307,595 1306,714 1307,595 1306,7595 1306,925 1305,590 1305,554 1304,866 1304,369	Cu II N I N I Cu II N I Cu II N I Cu III N I Cu III N I Cu III Cu III Cu II	5 4 3 10 30 20 2 3 2 2 1 5 4 1 2 30 15 3 6 3 3 3 13 3 10 2 2 8 25 4 1 25 1 4 15 20 30 3 2 30 — 3 25 50 5 30 100	1301,146 1299,267 1298,95 1298,960 1298,891 1298,67 1298,394 1297,96 1297,549 1296,600 1296,600 1296,600 1296,088 1295,91 1295,560 1294,914 1294,67 1294,543 1293,26 1291,64 1291,594 1291,64 1291,594 1291,64 1291,380 1290,204 1291,64 1291,380 1290,204 1289,983 1289,32 1288,633 1288,445 1288,055 1287,464 1286,38 1284,868 1284,793 1284,218 1283,798 1283,48 1283,798 1283,48 1283,49 1283,49 1283,49 1283,49 1281,50 1281,458 1281,098 1280,852 1280,604 1280,403 1280,403 1280,336	Si III Cu II Ti III Si III Ti III Cu II Cu II Cu II Cu II Cu II Si III N IV C III Fe II Ti III Xe I Fe II Ti III Si IV Ti III Ti III Cu II Cu I Cu I Cu II Ti III Cu II	14 10 40 18 15 50 15 3 2 14 5 2 20 30 8 12 50 17 3 30 20 15 1 15 3 30 20 15 40 8 1 15 40 8 1 15 40 8 1 15 40 8 1 15 40 8 16 8 16 8 17 8 18 8 18 8 18 8 18 18 18 18 18 18 18 1
1303 ,979 1303 ,656 1303 ,59 1303 ,320	Cu II Cu II Fe V Si III	2 2 1	1280 ,265 1280 ,225 1280 ,140	Cu II Ar II C I	5 1 2
1302 ,99 1302 ,586 1302 ,173	Si III Fe V Kr III O I	16 1 2 30	1279,995 1279,898 1279,230 1278,943	N I C I C I Kr III	1 5 6 1
1302,13	Al IV	2	1278 ,38	Ca III	2

			<u></u>		
λ	Symbol	I	λ	Symbol	I
1277,727 1277,551 1277,50 1277,282 1277,154 1276,800 1276,754 1276,206 1275,801 1275,570 1275,247 1275,154 1275,038 1275,021 1274,463 1274,463 1274,463 1274,131 1274,069 1273,716 1273,704 1273,49	C I C I Xe I C I C I N II C I N II Fe II N II Fe II N II C I C I C I C I C I C I C I C I C I	$egin{array}{c} 3 \\ 10 \\ 6 \\ 9 \\ 2 \\ 2 \\ 4 \\ 3 \\ 20 \\ 3 \\ 15 \\ 4 \\ 5 \\ 2 \\ 3 \\ 5 \\ 3 \\ 2 \\ 2 \\ 2 \\ 3 \\ 3 \\ 2 \\ 2 \\ 2 \\ 3 \\ 3$	1260,418 1259,937 1259,54 1259,309 1258,88 1258,795 1258,745 1258,745 1258,68 1257,58 1257,29 1257,190 1256,68 1256,52 1256,490 1255,685 1255,276 1255,026 1254,80 1254,717 1254,6	Si II Cu III Fe IV Kr III Al II Si I N II Kr III Fe IV Al IV Fe IV Ne III Si I Ne III Si I Ne III Si I C III Si I Li II	1000 10 30 3 4 50 3 3 2 3 6 6 6 1 40 5 10 2 10 3 1
1273,47 1273,423 1272,74 1272,720 1272,70 1272,638 1272,160 1272,036 1272,001 1271,940 1271,839	N IV Mg II N IV Mg II Al IV Fe II N IV Cu II Fe II Mg II	3 -2 -3 15 4 8 25 - 2 2	1253,538 1253,645 1253,179 1251,35 1251,164 1250,433 1250,199 1250,689 1250,045	C I Xe III Cu II Al IV Si II Xe I Si II Xe I Si II Cu II Xe IV	1 0, 5 2 5 1 200 450 2 100 10
1271,326 1271,239 1271,234 1271,08 1270,54 1270,28 1270,204 1268,483 1268,40 1267,633 1267,437 1266,694 1266,308 1265,66 1265,504	Cu II Mg II Cu III Fe IV Ca III N IV Kr III Ar II Fe IV C I Fe II C I Cu II Na III Cu II	2 	1249,28 1248,790 1248,76 1248,426 1247,383 1246,738 1246,51 1244,92 1244,756 1244,377 1243,73 1243,73 1243,179 1242,804	Cu II Al IV Si II C III Si II N IV N IV Xe II Cu III N IV N I N I N I N I	5 2 150 3 100 2 1 5 10 — 15 20 19
1265,315 1265,28 1265,023 1264,730 1264,14	Kr III Fe IV Si II Si II Al IV	4 15 200 2000 3	1241,961 1240,83 1240,395 1240,18 1239,925	Cu II Al IV Mg II Al IV Mg II	2 3 - 2 -
1263,47 1262,928 1262,51 1261,72 1261,560 1261,430	Fe IV Cu II Al IV Fe IV C I C I	15 3 1 10 8 5 7	1238, 821 1238, 325 1237, 776 1237, 14 1235, 920	N V Cu III Cu III Al IV Si II	20 1 3 4 10
1261,128 1261,000 1260,930 1260,738 1260,670 1260,542	C I C I C I C I Fe II	7 3 4 4 2 20	1235,839 1235,431 1235,40 1233,660 1233,20	Kr I Si III Na III Fe II N I	13 7 4 8 2

λ	Symbol	I	λ	Symbol	I
1232,074 1231,588 1231,406 1230,511 1230,288 1230,046 1229,94 1229,40 1229,388 1229,172 1228,790 1228,746 1228,617 1228,437 1228,410 1228,30 1227,788 1227,604 1227,226 1227,00 1226,986 1226,887 1226,887 1226,887 1226,881 1226,881 1225,192 1225,192 1225,192 1225,192 1225,089 1225,089 1224,960 1224,73 1224,960 1224,73 1224,252 1223,907 1223,80 1223,71 1223,44 1223,20 1222,635 1221,12	Xe III N I Si II C IV N I C IV Al IV N I Si II N I Si II Si II Si II N I Si II N I Si II N I N I Si II N I N I N I N I N I N I N I N I N I	25 1 5 3 0 2 2 200 1 10 150 25 10 5 1 2 100 1 3 40 20 1 50 2 4 10 3 3 40 20 1 40 20 1 40 20 40 40 20 40 40 40 40 40 40 40 40 40 4	1210,15 1209,19 1208,35 1207,517 1206,533 1206,510 1206,346 1205,95 1205,900 1201,626 1201,358 1200,711 1200,224 1199,718 1199,549 1198,6 1198,58 1198,47 1197,84 1197,812 1197,84 1197,82 1197,389 1196,29 1195,25 1194,656 1194,496 1194,494 1194,291 1195,25 1194,656 1194,494 1194,291 1192,060 1194,027 1193,674 1193,388 1193,284 1193,284 1193,252 1193,013 1192,923 1192,55 1192,480 1192,061	Al II Al II Al II Si III Si III Si III Si III Kr III Cu II Cu II Cu II Cl I N I N I N I Li II C IV Al IV Ar IV C I Si II Xe IV Ti IV C I Si II C I C I C I C I C I C I C I C I C I	2 1 3 9 30 30 5 1 2 2 11 30 0 2 50 7 1 1 0 5 250 7 1 1 0 5 2 5 7 2 5 7 1 1 1 1 1 2 5 5 7 7 8 8 8 8 8 8 8 8 8 8 8 8 8
1221,12 1220,882 1219,290 1219,19	Fe II Cu III Al IV	5 5 0	1191 ,99 1191 ,86 1191 ,855 1191 ,55	N I Al II C I Cs II	2 4 5 1 8
1217,643 1217,26 1216,896 1216,78 1216,117 1215,670	O I Xe IV Kr III Al IV Si II H	2 -5 1 10 3000	1191,03 1190,84 1190,52 1190,418 1190,354	N I N I N I Si II Ar IV	5 5 3 100 2
1215 ,340 1215 ,229 1215 ,171	D T He II	3000 3000 5	1190 ,07 1189 ,628 1189 ,628 1189 ,556	Al II C I N I C I	4 6 5
1215,088 1214,409 1213,764 1213,149 1212,011	He II Fe II Fe II Fe II Si III	2 10 20 20 20 2	1189,336 1189,244 1189,244 1189,21 1189,074 1188,972	N I C I Al II C I N I	4 3 4 2 3 5
1211 ,93 1211 ,80 1210 ,456	Al II Al IV Si III	3 0 10	1188,972 1188,935 1188,768 1188,006	C I Cl I N IV	5 1 12 6

Symbol	λ	I	Symbol	λ
N I Fe II N I C I C I Kr III Xe II C I Si III N I C I Cu II Cu II Cu II Cu II Si III C I Xe IV C I Al II C I Xe III N I Fe II N I N I N I N I N I N I N I N I N I	1159,858 1159,347 1159,285 1159,004 1158,729 1158,724 1158,398 1158,138 1158,138 1158,102 1158,051 1158,030 1157,871 1157,825 1157,46 1157,391 1157,333 1157,13 1157,391 1156,782 1156,619 1156,782 1156,619 1156,502 1156,480 1156,502 1156,480 1156,502 1156,502 1156,480 1156,502 1156,480 1156,502 1156,957 1155,839 1154,998 1154,998 1154,998 1154,998 1154,998 1154,23 1153,955 1153,773 1153,52 1153,781 1152,181 1152,181 1152,182 1152,181 1152,181 1152,181 1152,181 1152,181 1152,181 1152,181 1152,181 1152,181 1152,181 1152,1882 1152,181 1152,1882 1152,1882 1152,1882 1152,1882 1150,882 1150,885 1150,889 1150,292 1149,603 1149,47 1148,76	1 12835 87738 10815 43533523336 5342822031 121243320 8250212248 1203	Ar IV Cu II N III N I Ti IV Xe III Xe III N III Si III Na III Cs II Si III N I CI III C III C III C III C III C III N I Si III N I N I N I N I N I N I N I N I N I	1187,80 1185,899 1184,544 1183,998 1183,63 1183,053 1183,053 1183,030 1182,018 1180,40 1179,38 1178,65 1178,004 1177,694 1177,48 1176,626 1176,508 1176,508 1176,508 1176,5987 1175,711 1175,590 1175,263 1174,933 1174,84 1174,432 1174,369 1172,55 1172,529 1172,55 1172,529 1172,02 1171,606 1171,39 1171,067 1171,43 1170,276 1169,692 1169,63 1169,63 1169,478 1169,063 1169,63

λ	Symbol	I	λ	Symbol	I	_
1145,92 1145,23 1145,22 1145,177 1144,959 1144,946 1144,853 1144,306 1144,24 1144,052 1143,649 1143,32 1143,235 1142,97 1142,73 1142,642 1142,334 1142,282 1142,03 1141,705 1141,705 1141,70 1141,630 1141,765 1141,70 1141,630 1141,580 1141,20 1140,76 1140,688 1140,545 1140,391 1140,070 1139,894 1139,818 1139,794 1139,818 1139,794 1139,60 1139,49 1139,330 1139,15 1139,15 1139,15 1139,15 1139,37 1138,936 1138,642 1138,625 1138,642 1138,625 1138,936 1138,642 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936 1138,936	N I N I Si III Si III Si III Fe II Cu II Si III N I Fe II N I Fe II N I Cu II Fe II Si III N I Cu II Si III C I C I C I C I C I C I C I C I C I	1 2 8 7 6 35 30 8 2 5 5 1 25 2 2 20 5 6 1 3 1 2 3 7 1 2 3 6 1 1 7 1 6 2 0 3 1 2 1 2 5 3 2 3 5 3 2 5 2 0	1129,626 1129,19 1129,161 1128,909 1128,748 1128,72 1128,530 1128,340 1128,325 1128,180 1128,074 1128,02 1127,907 1127,442 1126,850 1126,72 1126,603 1126,72 1126,603 1122,35 1122,35 1122,35 1122,35 1122,30 1122,179 1121,987 1119,945 1118,80 1118,42 1117,990 1117,706 1117,686 1114,414 1113,228 1112,407 1112,086 1114,414 1113,228 1112,407 1112,086 1114,414 1113,228 1112,407 1112,086 1114,114 1110,62 1109,970 1108,368 1107,933 1107,600 1106,362 1106,215	C I Fe III C I Fe II Fe II Fe II Si IV Si IV Fe II Cu II Fe II Cu II Al IV Xe IV Si IV C I Si III C I Si III C I Si III C I Fe II CU II Al IV Xe IV Si IV C I Si III C I Si III C I Si III C I Fe II	1 7 6 20 1 7 10 10 10 5 25 8 40 20 20 6 20 20 9 20 5 25 9 8 4 0 1 25 15 4 4 2 18 5 35 15 3 16 14 2 1 3 3 5 15 15	
1134,15 1133,678 1133,413 1133,117 1132,8	Kr I Fe II Fe II N IV Li II	$egin{array}{cccccccccccccccccccccccccccccccccccc$	1105,182 1102,385 1101,538 1101,293 1100,525	Cu II Fe II Fe II N I Fe II	5 8 20 40 20	
1132,8 1131,194 1130,428 1130,344 1129,927 1129,777	Fe III Fe II Fe II Xe III C I Fe II	1 7 25 30 1 12	1100,49 1100,46 1100,432 1100,362 1100,050	Na III Xe I Xe II N I Si IV	5 15 10 30 1	
000						

λ	Symbol	I	λ	Symbol	I
1100,026 1099,80 1099,153 1099,117 1098,98 1098,78 1098,63 1098,408 1098,264	Fe II N I N I Fe II N I N I N I Si IV N I	20 2 25 25 2 1 2 1 40	1068,66 1068,476 1068,356 1067,94 1067,74 1067,607 1067,37	N I N I Fe II Cl II Xe IV N I N I Xe I	4 35 30 4 — 35 4 5
1098,204 1098,103 1097,990 1097,245 1097,16 1097,049 1096,886 1096,793 1096,749	N I N I N I N I Xe IV Cu II Fe II Fe II N I Fe II	25 50 25 30 20 35 20	1066,97 1066,660 1066,660 1066,650 1066,636 1066,614 1066,56 1066,391 1066,181	N I Ar I O I Si IV Si IV N I Xe III Fe III	4 15 9 8 8 8 8 3 12 10
1096,322 1095,940 1095,279 1094,401 1092,740 1092,422	N I N I N I Cu II C II C II	35 35 4 30 2 0	1066 ,143 1066 ,133 1066 ,121 1066 ,126 1065 ,883	Fe III Cu II C II N I C II	10 20 6 1 7
1092 ,240 1091 ,930 1091 ,288 1089 ,236 1088 ,94 1088 ,41	C II C II Cu II Cu II Xe I F V	0 1 5 3 10 0	1065 ,7822 1065 ,04 1063 ,982 1063 ,872 1063 ,83	Cu II Xe IV Fe II Fe III Cl II	15 8 10
1088.393 1086,691 1086,269 1086,110 1086,084 1085,701 1085,542	Cu II N IV N IV Cu II N IV N II N II	20 2 1 5 - 12 9	1063 ,30 1063 ,003 1062 ,758 1061 ,708 1060 ,630 1059 ,571	C II Cu II Fe II Fe III Cu II Fe II	$egin{array}{c} 0 \\ 60 \\ 20 \\ 6 \\ 60 \\ 20 \\ \end{array}$
1085,47 1084,951 1084,572 1083,990 1083,860	Xe He II N II N II Xe II	2 3 11 10 5	1059,0960 1058,796 1058,128 1057,503	Cu II Cu II Xe III Si II Si II	60 40 2 15 30
1083,210 1079,112 1079,08 1078,708 1077,325	Si III Si III Cl II N IV Si IV	6 4 15 6 1	1057,050 1056,9545 1056,582 1055,795 1055,328	Cu II Si IV Cu II Xe III	60 12 40 5
1076,589 1076,253 1075,24 1074,476 1073,738 1071,76	Si III Si III Cl II Xe II Cu II Cl II	10 3 7 15 30 10	1055,269 1054,6903 1053,90 1053,65 1053,38	Fe II Cu II N I N I N I	25 60 3 3 5
1071 ,656 1071 ,596 1071 ,05 1070 ,821	N I Fe II Cl II N I	1 30 20 0	1053,289 1053,03 1052,72 1052,470	Si III N I N I Cu II	10 3 2 20 3
1070, 308 1069, 984 1069, 198 1069, 193 1069, 038	Cu II N I N I Cu II Fe II	15 30 2 50 15	1052,16 1052,07 1051,920 1051,89 1051,596	N I N I Xe II N I Si IV	3 10 2 70

λ		Symbol	I	λ	Symbol	I	
1050, 1050, 1049, 1049, 1049,	,153 ,93 ,7556 ,65	Cu II Cu II Al II Cu II N V Cu II	10 10 2 50 3 20	1031,7661 1031,760 1031,65 1031,169 1030,924 1030,72	Cu II Ca III N I Si III Fe III N I	8 4 2 7 6	
1048, 1048, 1048, 1048, 1048,	53 272 218 218 20 801	Xe III Al II Xe II Ar I O I N V Xe III	3 1 8 25 8 2 10	1030,273 1030,261 1030,020 1029,747 1029,566 1029,53	Ca IV Cu II Kr I Cu II Ca IV N I	2 4 20 2 10 3 1	
1044, 1044, 1044, 1044, 1043,	69 516 13	Cu II N I Cu II N I N I	80 4 80 5	1028,64 1028,560 1028,3281 1028,162 1027,8312	N I Ca III Cu II O I Cu II	2 4 25 8 50	
1043 ,; 1041 ,; 1041 ,; 1041 ,; 1040 ,; 1039 ,;	81 688 306 941	N I Xe IV O I Xe II O I Cu II	2 5 1 9 15 60	1027,433 1027,309 1027,174 1027,04 1026,790	O I Ca IV K V Xe I Fe III	20 5 2 10 6	
1039 ,3 1039 ,2 1038 ,3 1038 ,3 1038 ,3	345 233 90 76	Cu II O I N I N I Fe III	60 20 1 1 6	1026 ,28 1026 ,113 1025 ,968 1025 ,766 1025 ,742	Xe IV Mg II Mg II O I K IV	_ _ _ 9 3	
1038,3 1037,9 1037,6 1037,6 1037,6	34 931 580 54 513	N I Ar IV Xe II N I O VI N I	6 1 6 1 9	1025,722 1025,443 1025,350 1025,280 1024,339	H D T He II Ca IV	1000 1000 1000 2 5	
1037,0 1037,0 1036,4 1036,3 1036,1 1035,7	017 1695 130 16	Si III C II Cu II C II N IV Fe III	7 13 60 12 8 6	1023 ,820 1023 ,693 1022 ,1021 1021 ,508 1021 ,332	Ca IV Si II Cu II Ca VI K V	4 50 5 4 2	
1035,7 1035,6 1035,3 1035,1 1034,9 1034,8 1034,3	57 66 631 6 48	Si III Ca III Cu II N I Ca III N I	3 4 8 1 3 2	1021,139 1020,699 1020,1075 1019,789 1019,6545	Ca V Si II Cu II Fe III Cu II	3 25 15 6 15	
1034 ,23 1033 ,93 1033 ,83 1033 ,63	87 20 75 5	Si III Si III K N I	4 8 2 0	1019 ,371 1018 ,7075 1018 ,346 1018 ,286 1018 ,0643	Ca III Cu II Ca VI Fe III Cu II	2 50 3 8 15	
1033,50 1033,48 1032,95 1032,85 1032,76	8 58 51 68	Cu II N I N I Si III K Ca VI	10 3 2 3 2 2	1017,745 1017,680 1017,254 1015,520 1015,083	Fe III Xe III Fe III Fe II Fe II	8 35 9 20 10	
1032,43 1032,19 1032,12 1031,91	38) 23	Xe II N I Fe III O VI	1 8 10	1015,023 1014,998 1014,162 1012,6834 1012,613	Cl III Ca III Ca V Cu II Ca V	7 3 4 3 3	

λ	Symbol	I	λ	Symbol	I
1012,5972 1012,417 1012,088 1011,4362 1011,037 1010,6395 1010,453 1010,376 1010,369 1010,267 1010,074 1009,854 1009,638 1008,875 1008,777 1008,7284 1008,5692 1008,08 1007,975 1007,657 1007,15 1006,015 1005,75 1005,365 1005,280 1004,68 1004,0557 1003,542 1003,370 1002,23 1002,095 1001,544 1001,048 1001,0130 1000,310 1000,056 999,7944 999,493	Cu II Fe II Fe II Cu II Ti III Fe II Ti III Fe II Ti III Ti III Ti III Ti III Cu II Ti III Ti III Ti III Cu II	25 25 20 2 25 3 10 30 10 9 3 1 6 30 0 25 20 1 6 0 7 5 2 30 2 35 0 2 30 0 2 30 0 30 3	991,514 991,232 990,88 990,805 990,800 990,210 990,132 989,867 989,790 989,2368 988,776 988,66 988,581 987,656 987,336 987,281 985,824 985,749 984,952 984,935 984,935 984,889 984,530 983,877 982,115 981,373 981,088 979,919 979,842 979,418 978,616 977,967 977,567 977,567 977,567	Symbol N III Fe III Al II O I Fe III O I O I Si II N III Cu II O I O I Ca V Cu II Ca III Kr III Fe III Cl IV Ca III Si IV Cu II Fe III K VI Fe III Xe III N III N III N III N III O I O I Cu II	14 9 1 2 6 8 1 100 16 8 15 2 3 5 10 5 18 8 4 7 4 1 10 10 2 10 7 9 8 5 4 1 4 100 25 6 2
999,495 998,397 998,3063 997,599 997,579 997,389 997,081	Ca III Cu II Fe III Ca IV Si III Fe III	2 3 8 6 7 16 7	977 ,4 977 ,026 976 ,708 976 ,678 976 ,540	Al C III Cu II Xe II Cu II	4 18 10 6 10
995 ,829 995 ,50 995 ,150 994 ,946 994 ,787	Fe II Xe VII Fe III Ca V Si III Fe III	8 3 6 3 13 6	976 ,505 976 ,452 976 ,217 975 ,825 975 ,055	F I O I F I Ca V Ca VI	40 5 100 4 3
994,724 994,311 993,519 993,080 992,9533 992,675	Ca IV Si III Fe III Cu II Si II	$\begin{matrix} 6 \\ 10 \\ 7 \\ 25 \\ 200 \end{matrix}$	974,124 973,895 973,884 973,508 973,437 973,240	Xe III F I O I Cu II Ca V O I Cl IV	8 350 4 2 6 5 5
992 ,370 991 ,829 991 ,579	He II Fe III N III	1 6 17	973 ,212 972 ,769 972 ,537	Xe II H	7 400

λ	Symbol	I	λ	Symbol	Í
972 ,401 972 ,272 972 ,263 972 ,184 972 ,118 971 ,84	F I D Cu II T He II Xe II	20 400 2 400 0,7	952,46 952,414 952,414 952,304 951,871 951,413	Xe IV O I N I N I F I Cu II	 8 8 500 5
971,818 971,741 969,652 968,518 968,236 968,037 967,946 967,197 966,466 966,231	Xe III O I Ca VI K VI Ca V Cu II Si III Fe III Ca V Cu II	8 6 6 3 25 9 6 6	951 ,35 951 ,08 951 ,06 950 ,888 950 ,732 950 ,344 950 ,114 949 ,743 949 ,485 949 ,335	N I N I Kr I O I O I Fe III O I H D He II	1 '3 0 4 10 0 200 200 200 0,3
965,540 965,042 964,962 964,626 963,991 963,34 962,896 961,901	Xe III N I Kr II N I N I Kr I Ca V Fe III	10 10 30 5 5 1 2 7	948,72 948,689 948,540 948,244 948,214 948,155 948,098 947,700 946,97	Cl III O I N IV C IV N IV C IV C IV Cu II CI III	1 4 5 4 1 2 2 2
961,49 960,409 960,325 959,54 959,22 958,86 958,705 958,585 958,524 958,149	Cl II Cu II Xe III N I Xe Ne I IIe II Xe III F I Cu II	10 20 2 3 2 1 0,5 4 500 40	946,769 946,703 946,52 946,208 945,981 945,976 945,860 945,566 945,524	Mg II Mg II Kr I C II C II Cu II C II C I	- 1 2 1 50 40 3 60
957,70 956,286 955,99 955,91 955,545 955,438 955,335 955,321 955,265 954,825	Xe IV Cu II Al II N I F I N I N IV Cu II N I F I	25 1 3 750 — 20 5 — 1000	945,45 945,401 945,336 945,193 945,095 943,910 943,328 943,267 943,22 942,52 941,660	Kr I T C I Fe II Fe II Cu II Fe II Cl III He II Fe II	1 200 2 1 25 15 60 12 1 0,2
954 ,774 954 ,378 954 ,11 953 ,98 953 ,975 953 ,658	Kr III Cu II N I N I Xe III N I	4 20 3 6 3 15	939 ,837 939 ,522 939 ,31 939 ,237 939 ,16	O I Cu II CI III O I Xe II	10 0
953,42 953,415 953,40 953,399 952,940	Kr I N I Cl III N I O I	1 15 2 6 4	939,159 939,093 938,967 938,621 938,287	Fe II Si III Fe II O I K VI	$ \begin{array}{c} 20 \\ 7 \\ 10 \\ \hline 2 \end{array} $
952,789 952,522 952,470	N I N I Fe II	3 4 10	938,022 937,841 937,814 937,804	O I O I Cu II H	3 5 120

λ	Symbol	I	λ	Symbol	I
937,548 937,464 937,40 936,630 936,484 936,28 936,060 935,892 935,405 935,25 935,24 935,20 935,183 935,074 934,703 933,46 933,420 932,940 932,940 932,940 932,0528 932,046 931,709 931,667 931,479 931,25 931,200 931,479 931,25 931,200 931,479 931,25 931,200 931,479 931,25 931,200 931,479 931,25 931,200 931,479 931,25 931,200 931,479 931,667	D T He II O I Fe II CI III Si III Cu II Xe II Cu II Xe IV Al II O I Cu II Fe II Fe II Fe II Fe II Si II O I Te II Fe II Fe II Si II CI III O I KE II FE II TE II T	120 120 120 120 38 8 1 3 60 2 20 40 1 4 60 7 5 60 30 30 10 10 10 5 10 5 25 1 80 30 30 30 30 40 5 10 5 10 5 10 10 10 10 10 10 10 10 10 10	925,866 925,125 924,970 924,283 924,239 923,884 923,675 923,433 923,353 923,220 923,150 923,057 922,899 922,815 922,519 922,411 922,017 922,011 921,992 921,364 921,301 920,963 920,713 920,629 920,29 919,7815 919,78 919,78 919,143 918,581 918,581 917,498	Symbol Xe II Cu II Fe II N IV Cu II Fe II N IV O IV O IV N IV H N IV O IV O IV O IV O IV O IV H D T Xe IV Ar II O II H Kr III K VI H K V Kr II Cu II Cu II O II H Kr III K VI H K V Kr II Cu II Cu II O II H Kr III K VI H K V Kr II Cu I	5 30 15 14 50 30 14 4 6 16 40 14 40 40 14 20 60 - 14 5 4 30 30 30 - 10 15 20 2 16 1 20 20 2 4 12 2 10 11 10 8 10 8 10 3 7 - 6
928,107 927,632 927,176 926,900	Fe II Fe II Fe II Fe II	30 8 30 25	914,919 914,90 914,576 914,286	H Cl H H	2 5 —
926,900 926,75 926,618 926,24 926,226	Cs II Fe II Xe IV ` H	20 10 — 50	914,209 913,853 913,264 913,012	Cu II Si II Si II Si II	30 20 3 10
926 ,226 926 ,220 925 ,974 925 ,890	Fe II D T	60 50 50	912,459 912,414	Xe II Si II Cu II	8 5 3 83

λ	Symbol	I	λ	Symbol	I	
912, 3 911, 73 911, 4 911, 3 911, 3 910, 96 910, 5 910, 5 910, 2 909, 6 909, 2 908, 8 907, 3 907, 2 906, 6 906, 7 906, 6 906, 6 906, 3 906, 3 905, 3 905, 3 905, 3 905, 3 905, 3 905, 3 907, 3 907, 3 907, 3 907, 3 907, 3 907, 3 906, 6 906, 6 906, 6 906, 3 906, 3 907, 3 907, 3 907, 3 907, 3 908, 8 908, 8 909, 8 898, 9 898,	75 Si II 784 Kr II 784 Kr II 785 D 822 T 84 Kr II 786 Fe III 785 N I 976 N I 976 N I 976 N I 978 N I 9	5 	894,310 894,226 893,989 893,905 893,674 893,56 892,621 892,417 892,411 892,056 891,999 891,833 891,442 891,21 891,172 890,982 890,755 890,755 890,567 889,722 889,722 889,276 888,363 888,07 888,019 887,41 887,404	Ar I Cu II Xe III Al III Cu II Cu II Ca IV K IV Fe III Cu II Al III Si II Xe III Fe III Xe IV Fe III Xe III Fe III Cu II Al III Si II Xe III Fe III Cu II N I Cu II Cu II Cu II	4 40 20 5 80 3 3 2 6 50 4 200 9 8 -10 20 2 9 60 100 15 0 4 10 6 3 60 3 10 6 30 3 25 5 3 3 5 - 8 8 30 10 5 6	
896 ,75 896 ,00 895 ,95 895 ,40	O3 Xe III 5 Cl II O6 Xe III	60 20 3 4	883 ,398 883 ,282 883 ,179	Si III Cu II Ar III	5 5 9	
894,91 894,35 894,34 894,34	10 C IV 51 Ca III 47 Si IV	1 4 3 4	883,159 883,127 882,88 882,184 881,405	Ca III C IV O I K VI K V	3 4 — 2 3	
A 30						

λ	Symbol	I	λ	Symbol	I
881 ,08 8 880 ,949 880 ,802	Fe III Fe III Xe II	7 6 5	869 ,336 869 ,062 868 ,98	Cu II Cu II N I	25 10 5
880 ,447 880 ,325	Fe III Cu II	6 5	868,869 868,552	Kr II K V	$egin{array}{c} 25 \ 1 \end{array}$
880 ,04 879 ,949 879 ,906	Xe VI Ar I Cu II	2 3 2	868 ,140 867 ,921 867 ,726	K V K V Cu II	1 1 8
879 ,622 879 ,553 879 ,108	Ar III O I O I	8 1	866 ,805 866 ,440 865 ,93	Ar I Cu II N I	4 5 3
$879,079 \\ 879,027$	O I	1 1 1	865,69 865,63	Xe IV N I	- 5
878, 979 878, 790 878, 728	O I Xe III Ar III	1 8 12	865,383 864,93 864,812	Cu II N I Kr II	$\begin{array}{c} 40 \\ 5 \\ 20 \end{array}$
878 ,728 878 ,696	O III Cu II O I	11 50 4	864,695 864,697	Ca III Cl II	$rac{4}{5}$
877 ,97 877 ,9 877 ,885	Cs III O I	7 2	864 ,199 863 ,386 863 ,15	Cu II Xe III N I	10 8 3
877 ,839 877 ,804 877 ,559	Cu II O I Cu II	$\begin{array}{c} 15 \\ 2 \\ 20 \end{array}$	862,90 862,578	N I Kr III	5 35
877 ,11 877 ,007	N I Cu II	$2 \ 25$	862 ,15 862 ,011 861 ,832	N I Cu II Fe III	5 40 10
876 ,79 876 ,719 876 ,674	N I Cu II Kr III	$\begin{array}{c}2\\20\\22\end{array}$	861 ,761 861 ,63	Fe III O I	8
876 ,32 876 ,063 875 ,764	N I Ar I N I	4 4 0	861 ,15 861 ,071 860 ,85	N I Xe III N I	1 5 4
875 ,534 875 ,534	Ar III O III N I	9 9 6	860 ,827 860 ,205	Ca VI N II	$egin{array}{c} 2 \\ 0 \\ 4 \end{array}$
875 ,25 875 ,092 874 ,985	N I K V	5 1	860 ,15 859 ,838 859 ,75	N I Fe III N I	6 2 8
874 ,883 874 ,045 873 ,865	K V K III K III	$egin{array}{c} 1 \ 3 \ 2 \end{array}$	859 ,721 859 ,626 859 ,35	Fe III Fe III N I	6 3
873 ,462 873 ,264	Fe III Cu II	8 15	859 ,040 858 ,855	Kr II Ca IV N I	$\begin{array}{c} 3 \\ 20 \\ 3 \\ 2 \end{array}$
872,313 872,006 871,850	K III K VI N III	4 1 0	858,80 858,602 858,59	Fe III Xe VIII	6 3
871 ,42 871 ,099	Xe II Ar III O III	6 10 10	858,561 858,482 858,374	C II Cu II N II	9 25 1
871 ,099 871 ,064 871 ,01	Cu II N I	8 1	858 ,094 857 ,76	C II N I	8
870 ,825 870 ,544 870 ,40	Kr III Cu II N I	20 8 3	856 ,80 856 ,791 856 ,768	N I Ca III Al III	2 2 4 5
870,346 870,00	Xe III N I	6 3	856 ,635 856 ,24	Ca III N I	$rac{4}{2}$
869 ,965 869 ,754 869 ,66	K V Ar I N I	3 2 5	855 ,815 855 ,701 855 ,70	K IV Cu II N I	$\begin{smallmatrix}2\\10\\2\end{smallmatrix}$
869,66	14 7	J	1 000,10	_	830

				_	
λ	Symbol	I	λ	Symbol	I
855,474 855,040 854,923 854,789 854,771 854,71 854,416 854,367 852,950 852,898 851,992 851,842 851,76 851,70 851,332 851,300 851,29 851,150 851,147 850,966 850,76 850,76 850,74 850,602 850,572 850,318 850,142 849,354 849,248 848,074 847,700 847,578 847,425 846,611 846,534 845,925 846,611 846,534 845,925 845,774 845,408	Cu II Al III Ca VI Si IV K V Kr III Xe II K V Fe III Cu II Fe III Cu II Cu II Cu II Cu II Xe IV Fe III Xe III Cu II Fe III Fe III Fe III Fe III Fe III Fe III Fu III	5 4 3 7 1 25 6 2 6 2 7 7 2 7 8 3 2 2 5 6 6 6 7 8 3 6 7 8 7 8 7 8 7 8 7 8 7 8 8 7 8 7 8 8 7 8 8 7 8 8 7 8 7 8 8 7 8 8 8 7 8 8 8 8 7 8 8 8 8 7 8 8 8 8 8 7 8 8 8 8 7 8 8 8 8 7 8 8 8 8 7 8 8 8 8 8 7 8 8 8 8 7 8 8 8 8 8 8 7 8 8 8 8 7 8 8 8 8 8 8 7 8 8 8 8 7 8 8 8 8 7 8 8 8 8 7 8 8 8 7 8 8 8 8 7 8 8 7 8 8 8 7 8 8 8 8 7 8 8 8 7 8 8 8 8 7 8 8 8 8 8 8 7 8	840,46 840,162 840,029 839,73 839,63 839,439 839,30 838,449 838,048 837,666 837,439 836,521 836,521 836,521 836,126 836,126 836,126 835,792 835,292 835,096 835,01 835,003 834,967 834,944 834,840 834,67 834,659 834,462 834,840 834,67 834,659 834,462 834,397 833,742 833,326 832,927 832,754 831,431 830,785 830,377 829,343 827,85 827,777 829,343	Symbol Xe IV Xe III Ar IV Xe Cl II K V Cl II Xe III Fe III Fe III N II Fe III N II Si IV Ar V O III O III Xe IV Ar I Cl IV Fe III Ar V Cl IV Cl IV Cl II Cl IV Cl II Cl IV O II Ar I O III Cl IV	7 15 2 1 2 3 8 22 7 1 3 7 0 3 1 2 1 6 5 6 4 5 10 3 15 6 16 15 14 4 1 18 5 1 6 3
844,058 843,772 843,718 842,950 842,808 842,483 842,35 842,035 842,020 841,41 841,105 840,933 840,921 840,901 840,808	Kr II Ar IV Si II Ca V Ar I Cu II Xe Kr IV Fe III Cu II Cu II Cu IV Ca III Si IV CI IV	25 20 20 3 2 3 5 22 6 4 2 4 3 5 6	827,055 826,995 826,432 826,395 826,371 826,15,825,559 825,559 825,348 824,881 823,800 823,408 823,408 823,273 823,273 823,210 823,047	Ar V Cu II Kr II K V Ar I Xe III K V Ar I Xe III Cu II Si III K V N IV Fe III Xe III K V	5 30 22 1 2 4 1 1 30 2 9 3 2 6 25 3

λ	Symbol	I	λ	Symbol	I
822,844 822,647 822,159 821,60 821,583 821,568 821,450 821,161 820,918 820,516 820,15 820,129 818,590 818,147 818,129 817,9 817,058 817,038 816,805 816,805 816,466 816,273 816,233 816,163 815,049 814,242 813,882 813,885 813,385 813,382 812,158 812,096 811,710 811,51 811,501 811,501 811,501 811,480 811,480 811,480 811,997 810,997	Si II Xe III Ar V Xe IV Ca V K V Si II Kr II Si II Xe III Xe III Xe IV Ar I Si II Kr II Si IV Ca VI Fe III Kr IV Ca VI Fe III Fe III Si IV Fe III Cu II	5 4 4 - 1 1 1 2 20 3 20 4 - 2 25 8 1 2 7 18 2 4 6 4 6 7 6 20 20 10 - 3 1 - 1 1 8 4 15 7	806,964 806,875 806,846 806,684 806,555 806,555 806,550 806,384 806,373 805,95 805,763 805,763 805,101 804,45 803,826 803,325 803,066 802,841 802,8 802,250 802,122 801,980 801,154 801,409 801,359 801,409 801,359 801,154 801,086 800,84 800,819 800,573 800,573 800,228 800,066 799,947 799,660 799,338 797,744 797,566	F I Ar I C II C II K V C II C II K V Xe II K IV Si II Xe II K V Ca V Xe II CU III CS III O IV O IV K V Xe III Ar IV Ar I CU III Ar IV Ar I CU III Ar IV Xe III Ar I CU III Ar I CU III	150 2 6 4 2 7 3 5 2 5 7 10 5 2 1 3 150 00 5 6 2 15 15 10 1 200 10 2 3 5 2 15 10 10 10 10 10 10 10 10 10 10 10 10 10
810,937 810,893 810,667 810,215 810,119 809,933 809,770	Ca V K V O I K V Xe III Ar I C II	4 1 1 1 7 2 3	797,452 796,982 796,97 796,678 796,661 796,070 795,774	Cu II F I Xe IV Kr II O II Xe III F I	$ \begin{array}{c} 10 \\ 3 \\ - \\ 6 \\ 10 \\ 12 \\ 2 \\ 2 \end{array} $
809,682 809,673 809,599 808,860 808,840 808,77 808,583 807,855	C II K V F I Xe III Fe III Cs II Cu III Fe III	4 2 125 3 8 20 20 8	795, 36 795, 258 794, 417 793, 977 793, 53 793, 47 793, 34 793, 292 793, 065	Cl II Cu III F I Xe III Xe Cl II Cl II Xe III Cu III	2 10 8 4 3 3 8 100
807,702 807,547 807,220	Ar I Fe III Ar I	9 2	793,003 792,971 792,937	0 I 0 I	3

λ	Symbol	I	a	Symbol	I
792,896 792,536 792,510 792,237 792,19 791,976 791,875	Xe III F I O I O I Cl II O I F I	15 10 1 1 2 3 12	778,172 778,059 777,712 777,55 777,531 777,508 777,125 777,010	N V F I N V Cl II F I Ca VI Cu III F I	2 6 1 3 4 1 200 5
791 ,516 791 ,371 790 ,203	O I Cu III O IV	1 300 16	776 ,957 776 ,926 776 ,91	K VI F I Cl IV	4 4 0
790, 103 790, 064 790, 006 789, 840 789, 01 788, 75	O IV Xe III F I Cu III Cl II Cl II	13 5 7 200 7	776 ,82 775 ,966 775 ,957 775 ,526 774 ,738 774 ,532	Ti IV Ca VI N II Ca IV K Ca VI	10 3 12 3 3 3
788 ,462 788 ,073 787 ,710	Cu III Cu III O IV	300 400 15	774,532 774,53 774,522 774,354	Xe O V Ca V	3 7 3
787, 62 787, 31 787, 15 786, 464 786, 141 785, 968	Cl II Xe II Cl II K V Ne IV Kr III	3 6 1 2 1 25	774,088 773,684 772,975 772,891 772,641 772,389	Ca V Kr II N III N III Ca III Ca VI	5 18 8 9 2 1
784,713 784,393 784,09	K V C III Xe Xe IV	$egin{array}{c} 2 \\ 3 \\ 2 \end{array}$	772 ,385 771 ,901 771 ,544	N III N III N III	12 11 10
783,73 783,715 782,976 782,6 782,575 782,378	Kr II F I Cs III F I F I	20 5 3 2 10	771 ,456 771 ,376 771 ,103 771 ,024 770 ,928	K V K V K VI Kr II Ca VI	3 3 5 18 1
782,084 781,78 781,654 780,713 780,519	Kr II Ti IV F I F I F I	25 20 3 5 10	770 ,698 770 ,409 770 ,379 770 ,350 770 ,294	O I Ne VIII C IV O I O I	0 8 0 - 1
780,390 780,324 780,250 780,030 779,997 779,972	F I Ne VIII Ne IV Xe III O IV F I	15 4 3 7 6 2	770 ,287 770 ,264 770 ,022 769 ,402 769 ,355	K V O I K VI K V O I	3 1 1 2 1
779 ,919 779 ,910 779 ,905 779 ,824 779 ,821	Ca V F I O IV Ca V O IV	5 10 3 9	769 ,152 769 ,143 768 ,411 768 ,104 767 ,71	Ar III Xe III O I Kr III Ar VI	12 10 1 1
779,781 779,734 779,365 779,300 779,192 779,126	Xe III O IV F I Cu II F I Xe III	5 6 6 8 2 25	767,06 766,522 766,202 765,644 765,314	Ar VI Ca VI Kr II K III K III	2 1 9 6 4
779,14 778,718 778,603 778,528	Ti IV Ca VI Cu III K III	20 1 50 7	765,154 765,148 765,120 764,358 764,357	Ca VI N IV Xe III Ca VI N III	6 15 7 3 15

		1	ii		
λ	Symbol	I	λ	Symbol	I
763,976 763,736 763,344 763,340 762,200 762,001 761,861 761,790 761,470 761,130 761,050 760,445 760,439 760,229 759,440 758,9 758,50 758,559 758,517 757,112 757,08 756,7 756,563 756,031 755,8 755,603 755,362 755,212 754,93 754,824 754,673 754,205 754,194 754,148 754,144 753,877 753,303 752,884 752,762 752,051 751,861 751,73 750,986	Kr II Xe III Ca VI N III Ar II O V Ca VI Xe III Ar IV O V Kr II O V O V Cs III O V Xe IV K V Ne IV K V F I Cl IV Xe III Ar IV Ar II F I Ar IV Ar II K IV Ar III Ar III Ar IV Ar III Ar III Ar IV Ar III Ar III Ar III Ar IV Ar III Ar I	11 7 214 3 10 0 5 5 10 18 12 3 10 10 1 1 10 2 2 2 3 1 3 4 4 4 4 1 1 1 1 2 2 2 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4	748,580 748,409 748,4 748,393 748,364 748,338 748,291 748,198 748,195 747,999 747,848 747,677 747,553 747,415 746,976 746,864 746,834 746,695 746,627 746,350 745,763 745,763 745,763 745,205 744,925 744,141 743,970 743,870 743,870 743,870 743,721 743,303 743,292 744,141 743,970 743,870 743,721 743,303 744,955 744,141 743,970 743,870 743,721 743,303 744,955 744,141 743,970 743,870 743,721 743,303 744,955 744,141 743,970 743,870 744,955 744,141 743,970 743,721 743,303 744,955 744,441 740,406 740,270 739,949 739,177 737,979 737,457	F I Ca V O I K N II F I N V Ar II N V F I K VI K Cl III Cl III Kr III F I K IV N II F I Kr III Xe III Kr III	4 3 1 2 5 2 9 4 8 1 5 7 3 8 6 2 3 7 10 4 8 6 30 3 12 20 2 9 8 9 15 10 0 0 0 10 0 0 0 0 0 0 0 0 0 0 0 0
750 ,226 750 ,155 749 ,993 749 ,941	O II Xe III K IV Si IV	2 8 6 5	736 ,762 736 ,031 735 ,892	Cu II Ne I	25 30
749,662 749,3 748,946 748,709	O II O I F I F I	1 1 3 2	735 ,519 735 ,224 734 ,5 733 ,891 733 ,314	Cu II Cu III Cs III Cl VI Xe III	20 100 1 3 10

732,688	λ	Symbol	I	λ	Symbol	I
718,9 Al 3 702,899 O III 17 718,89 Xe 3 702,822 O III 16 718,562 O II 16 702,799 Xe III 8 718,484 O II 17 718,171 Cu II 10 702,332 O III 16 702,112 Cu III 20 718,091 Ar II 4 701,692 Cu III 15 717,15 Cl II 2 700,277 Ar IV 8	732,688 732,63 732,259 732,026 731,858 731,030 730,929 730,365 730,311 730,264 730,257 730,241 729,402 729,39 729,39 729,3 729,39 729,1 728,94 728,906 728,810 727,646 727,537 727,058 726,99 726,948 726,295 725,848 725,716 725,64 725,550 725,309 725,27 724,623 724,420 724,437 723,361 722,2 722,036 722,036 721,630 721,199 720,432 719,85 719,506 719,26	Cu III Xe IV Kr III Cu III K V Xe III Ar II Cl II Cu III Cl II Cu III Ca V Si IV Kr II Cl II Cu III Fe III Cu III K V II III Cu III Kr III	5 -4 100 2 15 5 3 150 4 3 5 2 20 3 0 -3 2 6 1 3 9 2 3 15 8 8 3 15 8 8 3 15 8 16 16 16 17 16 17 16 17 16 17 16 17 16 17 16 17 17 17 17 17 17 17 17 17 17 17 17 17	716,09 715,999 715,986 715,645 715,599 715,58 715,530 714,879 714,772 714,03 713,999 713,860 713,81 713,518 713,518 713,262 713,041 712,728 712,688 712,668 712,668 712,473 712,040 712,036 711,834 711,190 710,932 710,677 710,576 710,576 710,519 709,303 709,195 709,16 708,85 708,838 708,4 708,356 707,43 707,315 706,298 706,224 705,84 705,783 705,762 705,641 705,353 705,762 705,641 705,353 705,096 704,838 704,523 703,906 703,850	Xe K VI Xe III Ar V Ar V Cl II Cu III CI II Kr III Cl II Kr III N V Ar VIII N V Cu III K VI Si IV O V Cl II Cu III Kr III Cl II Cl	2 5 4 3 4 3 200 1 2 2 7 8 5 6 10 1 1 1 3 3 15 5 8 3 4 1 5 5 4 1 8 4 4 4 2 3 8 5 2 3 3 12 4 4 9 18
	718,89 718,562 718,484 718,171 718,091	Xe O II O II Cu II Ar II	$\begin{array}{c} 3 \\ 16 \\ 17 \\ 10 \\ \end{array}$	702,899 702,822 702,799 702,332 702,112 701,692	O III O III Xe III O III Cu III Cu III	17 16 8 16 20 15

λ	Symbol	I	λ	Symbol	I
700 ,24 700 ,182	Ar VIII Cu III	10 20	686 ,5 686 ,489	Cs III Ar II	0 2
699,72 $699,408$	Ar III Ar IV	1 6	686 ,480	CII	2
699,070	Xe III	5	686,335 686,254	N III Kr III	14 20
698 ,771 698 ,541	Ar II Xe III	$\frac{4}{20}$	686 ,190 685 ,816	Ca III N III	$\frac{2}{16}$
$698,037 \\ 698,02$	Kr III Xe VII	$\frac{20}{10}$	685,812 685,807	Kr II Ca VI	11 4
697,940	Ar II	2	685,513	N III	$15 \\ 2$
697,930 697,74	Cu III Ar III	$\frac{20}{2}$	685,396 685,139	Cu II Cu II	8
697,526 697,489	Xe III Ar II	8 2	684,996 684,490	N III Cl IV	$\begin{array}{c} 14 \\ 0 \end{array}$
696,212 696,206	Al III Ca III	4 3	683,97 683,666	Xe IV Kr III	18
696,202	K III Kr VIII	1 8	683,568	Si IV	1
695,91 695,824	Ca III	4	683,278 683,171	Ar IV Cl V	10 4
695 ,820 695 ,81 7	K III Al III	3 5	683 ,135 682 ,82	Si IV Xe	1 7
695,604 695,537	Kr III Ar III	15 6	682,791	Kr II	16
695 ,042 694 ,477	K V K V	$\overset{\circ}{3}$	682,581 682,564	F I Xe III	$\frac{2}{7}$
693,972	Xe III	10	682,56 682,171	Xe V Cu III	$\begin{array}{c} 3 \\ 200 \end{array}$
693,510 693,301	Cu III Ar II	$\frac{50}{2}$	681 ,924	Cl V	4
691 ,919 691 ,557	Kr III Cu III	18 100	681 ,911 681 ,908	Si IV Ca III	1 4
691,388	N III	1	681 ,119 680 ,709	Kr II F I	$\frac{16}{2}$
187, 691 691, 038	N III Ar II	2 1	680,679	Si IV	1
691 ,03 6 690 ,689	Xe III Si III	$\frac{7}{2}$	680,58 680,119	Xe Kr III	$\begin{array}{c} 2 \\ 22 \end{array}$
690,557	Kr II C III	11 7	679,400 679,257	Ar II Cl V	$rac{6}{3}$
690,526 690,40	\mathbf{Xe}	1 7	679 ,221	Ar II	3
690 ,397 690 ,250	Xe III Cu III	7 5	679 ,217 679 ,003	F IV F IV	16 13
690,170 689,538	Ar III Ca VI	8 3	678,055 678,0	Si III Al	2 5 5
689 ,15 689 ,007	Xe IV Ar IV	12	677 ,951	Ar II	
688,935	Si IV	2	677 ,224 677 ,154	F IV F IV	15 13
688 ,933 688 ,907	Cl V Ca III	$\frac{4}{3}$	676,981 676,785	Si IV Cl V	$\frac{1}{3}$
688 ,392	Ar IV Xe III	7 4	676,775	Ca V	1
688 ,231 688 ,085	K	3	676,606 676,564	Xe III Cu III	$\frac{9}{300}$
687 ,98 7 687 ,979	Cu III Kr III	100 11	676,564 676,241	Kr III Ar III	$\begin{array}{c} 25 \\ 6 \end{array}$
687,55	Cl II K IV	1 6	676 ,241	Ar II	6
687,495 687,355	CII	11	676,130 675,601	F IV Cu II	$\frac{14}{2}$
687,059	C II Cu III	10 15	674 ,828 674 ,278	Kr III Ca VI	$\frac{8}{2}$
686,903 686,73	Xe	1	674,046	Ca VI	1
					84

λ	Symbol	I	λ	Symbol	I
673,996 673,87 673,813 673,768 673,598	Xe III Xe Xe III O II Cl III Si III	9 3 9 7 1 5	663,08 663,039 663,039 662,454 662,15 661,869	Cl II Kr III Kr II Cl IV Cl II Ar II	2 20 20 3 1 5
673,427 672,948 672,941 672,856 672,826 672,659	Cl III O II K IV Ar II Kr III Cu III	3 8 5 2 7 50	661,82 661,402 661,124 660,280 660,124 660,04	Cl II K Vl Xe III N II Xe III Ne I	2 3 4 9 8 2
672,57 672,428 672,330 672,293 671,999 671,852	Xe IV Cl IV Kr III Si III N II Ar II	-0 25 4 6 6	659 ,854 659 ,852 659 ,716 659 ,538 658 ,758 658 ,637	Si IV K VI Kr III O III O III Kr II	1 3 22 0 1 5
671,770 671,718 671,629 671,391 671,37 671,365 671,354	N II Si III N II N II Cl VI Ca V Si IV	6 2 6 8 4 6 5	658,337 657,931 657,828 657,335 657,327 657,327	F III K VI Xe III F V K VI N II	12 3 8 4 3 1
671,198 671,175 671,058 671,014 670,948	Al III Kr III Kr III N II Ar II	2 7 7 6 5	657,320 657,220 657,15 657,088 656,878 656,772	Cl III F V Cs II Kr II F III Cl III	2 1 5 13 11 2
670,881 670,813 670,55 670,508 670,383	N II Kr III Xe III N II Cl III Kr III	1 3 2 1 3	656,763 656,125 656,038 655,677 655,09 654,034	Ca V F III Ca IV Kr II Cl II F V	6 10 15 5 1
670,289 670,144 669,949 669,725 668,864 668,827 668,770	N II Al III Cl III Ca IV K VI Kr II Cl IV	2 1 2 10 3 20 2	653,80 653,720 653,696 653,332 653,013 652,223	Cl II Ca III Cl IV Si III Cl III Si III	1 4 4 8 2 6
668,473 668,43 667,49 666,17 666,08 666,010	Xe III Cs II Cl II Cl II Cl II Ar II	4 12 1 2 3 6	651 ,668 651 ,57 651 ,550 651 ,342 651 ,324	Si III Kr VIII Ca V C II K VI	4 10 5 8 1
665,870 665,21 665,09 664,877 664,844 664,67	Kr II Cl II Xe Xe III Kr III Cl II	9 1 4 6 11 2	651,269 651,216 651,198 651,13 650,88	C II C II Kr III Cl II Cl II	7 7 8 1 1
664,563 663,67 663,134	Ar II Cl II K VI	4 2 3	648,50 647,879 647,876 647,31	F VI F V Ca V F VI	1 1 5 1

A Symbol I A Symbol I						
646,667 Xe III 5 636,247 C II 4 646,646,570 C aV 8 636,247 C II 4 646,467 Kr III 20 635,988 C I II 3 646,417 Kr III 20 635,988 C I II 3 635,988 C I II 2 635,764 Si IV 15 635,318 C a IV 8 646,108 K IV 15 635,318 C a IV 8 645,764 Si IV 2 635,318 C a IV 8 645,764 Si IV 2 635,318 C a IV 8 645,00 F VI 1 632,180 N II 5 644,620 F VI 1 634,2265 Kr II 4 644,963 K V 0 634,226 Kr II 4 644,825 N II 8 634,226 Kr II 1 1 634,225 Kr II 1 1 633,375 Kr II 5 644,425 N II 8 633,631 Kr III 5 644,425 N II 1 8 633,375 Kr II 5 644,488 Ar VII 2 633,385 Kr III 5 644,488 O II 1 2 633,385 Kr III 5 644,488 O II 1 1 2 633,385 Kr III 7 644,488 O II 1 1 2 633,385 Kr III 7 644,498 F VI 1 1 633,350 Kr III 7 644,304 Kr II 9 632,90 Na VI 0 0 643,404 Kr II 9 632,90 Na VI 0 0 643,404 Kr II 9 632,90 Na VI 0 0 643,404 Kr II 9 632,90 Na VI 0 0 643,404 Kr II 1 6 630,486 Kr III 7 644,888 Ar III 1 1 6 630,486 Kr III 7 6 641,808 Ar III 1 2 630,306 Kr III 7 6 641,808 Ar III 1 2 630,306 Kr III 7 6 641,808 Ar III 1 2 630,306 Ar VIII 2 630,306 Ar VIII 2 641,304 Ar III 5 630,306 Ar VIII 2 630,306 Ar VIII 2 630,306 Ar VIII 2 630,306 Kr III 1 1 6 630,928 Kr III 1 1 6 630,928 Kr III 1 1 6 630,938 Kr III 1 1 1 6 639,739 Kr III 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	λ	Symbol	I	λ	Symbol	I
637,466 Ar VII 1 625,404 K V 4 625,130 O IV 14 625,130 O IV 14 625,011 Kr III 9 624,617 O IV 13 624,268 Kr III 3 637,052 Ar VII 4 623,768 CI III 3	647,42 646,667 646,570 646,417 646,36 646,188 646,10 645,764 645,167 645,02 644,963 644,825 644,621 644,521 644,521 644,148 643,98 643,404 643,256 643,19 643,118 642,84 641,875 641,883 641,875 641,883 641,772 641,591 641,364 641,318 641,304 640,928 640,870 640,928 640,870 640,36 639,99 639,981 639,757 639,42 638,42 638,42 639,263 639,208 638,23 638,23 638,214	Xe IV Xe III Ca V Kr III F VI K IV F VI Si IV N II F VI Cs III K V N II N II F VI O III O II F VI Kr III Ca VI Kr III C II C II C II C II C III	-58203 1512101 140981 261219 92616 212665 21152 225631 55240	636,348 636,247 636,454 635,988 635,87 635,323 635,318 635,312 635,480 634,265 634,24 634,208 633,815 633,631 633,755 633,187 633,186 633,187 633,186 633,183 633,082 632,90 631,550 631,006 630,746 630,746 630,380 630,306 6	Kr III C II Kr II C II CI II CI II CI V Ca IV Si IV N II Kr II CI II Ar VII Ca III Kr III Ca III Kr III Ca III Kr III CI III Kr III K VI CI III K VI K VI K III K VI K VI K III N II N II N V N V Kr III N V N V Kr III N V N V Kr III K VI X III N II N V N V Kr III N II	1 4 3 3 2 4 8 10 5 4 1 2 2 5 5 5 4 3 7 0 7 1 1 1 1 2 2 7 6 5 6 2 15 2 2 2 4 3 7 3 3 5 15 2 4 6 1 1 4
636 ,818 Ar III 3 623 ,767 Ar III 5 636 ,62 Cl II 2 623 ,016 K VI 8	637,466 637,282 637,195 637,06 637,052 636,818	Ar VII Ar III K VI Cl II Ar VII Ar III	1 20 1 1 4 3	625,404 625,130 625,011 624,617 624,268 623,768 623,767	K V O IV Kr III O IV Kr III Cl III Ar III	4 14 9 13 3 3 5

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λ	Symbol	I	λ	Symbol	I
622,795 622,144	Kr III C III	11 2 5	609,705 609,673	O III	6 4
621 ,910 621 ,448 621 ,280	Kr II Kr III Cl III	8 4	609,460 609,275 609,168	Kr III C III Ne IV	9 6 1
621 ,279 621 ,12 624 ,074	Ca III Cl II Kr II	3 4 5	609,025 608,904	C III Si IV	4 1
$\begin{array}{c} 621 ,071 \\ 621 ,027 \\ 620 ,28 \end{array}$	Cl III Cl III	3 1	608 ,903 608 ,895 608 ,395	Cl IV Ca III O IV	4 3 14
619 ,548 619 ,44 619 ,379	Kr II Xe IV Kr II	$\frac{2}{2}$	608 ,124 608 ,065	Kr II F II	5 7
619,092 619,025	Ne I Cl III	4 1	607,98 607,931 607,472	Cs II K II F II	1 5 6
618,879 618,67 618,668	Kr II Kr VII Ne I	3 1 5	607,31 607,088	Cs II Cl IV	3 3
618,515 618,042	Kr II Kr II	$\frac{2}{4}$	607,069 606,925 606,805	Ca III F II F II	3 5 8
618,02 617,750 617,61	Cl II Kr II Cl II	2 4 1	606,527 606,460	Ne IV Kr III	5 9
617,517 617,27	Ca VI Cl II	4 0	606 ,345 606 ,333 606 ,284	Cl III Ca III F II	$5\\2\\6$
617,068 617,051 617,033	Kr II O IV [,]	6 6 7	606,100 605,908	Cl III K IV	2 1
616 ,933 616 ,728	O IV Kr III	3 5	605 ,862 605 ,855 605 ,776	Kr III Cl III Kr II	9 1 5
616 ,485 616 ,363 616 ,291	Kr III O II O II	6 4 7	605,668 605,595	F II Ne IV	7 2
616,136 615,623 615,40	K VI Ne I K II	$egin{array}{c} 6 \ 5 \ 2 \end{array}$	605 ,536 605 ,316 605 ,316	Kr II K IV Kr II	5 1 5
615 ,225 615 ,134	Kr II Kr II Ca VI	4 4	604,590 604,355	Cl IV Kr III	5 4
614,015 613,336 612,82	Kr II Cs II	3 4 7	604,152 603,849 603,666	Ar III Kr III Kr III	$\begin{array}{c} 10 \\ 6 \\ 7 \end{array}$
612,73 612,621 612,371	Cl II K II Ar II	0 4 5	603,622 603,429	Ca III K V	3 8
612,272 612,082	K VI Si IV	$\begin{bmatrix} 1 \\ 2 \end{bmatrix}$	602 ,999 602 ,95 602 ,858	Ne IV Cs II Ar II	$egin{array}{c} 2 \\ 1 \\ 2 \end{array}$
612,070 612,062 611,862	Cl IV Ca III K VI	4 5 3	602,712 602,43	Ne I Xe IV	- -
611 ,362 611 ,26 611 ,187	Xe IV Kr III	8	602,389 602,269 601,878	Ca VI K V N III	0 5 0
611,100 610,850 610,746	Kr III O III O III	9 6 8	601,700 601,499	Ca VI Cl IV	5 5
610,740 610,740 610,043	Ca III O III	$\begin{bmatrix} 3 \\ 7 \end{bmatrix}$	601 ,458 601 ,4041 601 ,134	N III He I Kr III	1 5 7
609,901 609,829	Cl III O IV	0 15	600 ,917 600 ,765	Ca VI K II	6 6

λ	Symbol	ī	λ	Symbol	I
600,585 600,532 600,369 600,265 600,167 600,04 599,944 599,944 599,733 599,598 599,19 598,968 598,86 598,791 598,66 598,86 597,818 597,701 597,194 596,944 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401 596,576 596,401	O II C II C II C II C II Kr III Kr III Kr II Xe VI CI IV O III CI II Kr II Ne I Kr II Ne I Kr II Kr II Kr II Kr II CI II Kr II Kr II Kr II Kr II Kr II Kr II CI III	6 2 3 1 5 2 4 4 3 2 18 0 3 1 3 2 0 15 2 6 4 4 6 6 6 4 2 3 3 2 7 7 7 6 3 4 0 1 3 9 7 1 1 0 2 2 4 3 1	589,783 589,262 589,16 588,921 588,77 587,872 587,78 587,604 587,6 587,543 587,543 587,311 587,295 587,20 587,078 587,006 586,880 586,874 586,322 586,30 586,269 586,25 585,950 585,754 585,666 585,668 585,668 585,666 585,608 585,417 585,37 585,25 585,410 583,437 585,496 584,3340 584,10 583,437 582,46 582,150 582,140 581,496 581,496 581,496 581,496 581,496 581,496 581,496	Ar VI Kr II Ne I Ar VI Cl II Ca VI Xe IV Ca VI Fe IV Kr III Kr III Cl III Ne I Cl III Xe IV K V Ne I Kr III CI III Kr III	2 5 1 5 0 1 2 2 4 4 3 4 1 3 1 2 4 8 1 5 8 8 6 6 5 8 8 8 6 1 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
591 ,428 591 ,4117 591 ,311	Cl III He I K IV K IV	4 20 1 1	580,577 580,50 580,444 580,400	Kr III Ne I Cl VI O II	$\begin{array}{c} 2\\6\\-\\2\\6\end{array}$
591,237 591,118 591,08 590,396	Cl III Cs II Ca VI	3 3 3	580,342 580,319 580,264	Kr II K V Ar II	3 7 3 6
589 ,92 589 ,82	Ne I Cl II	1	579,823 579,775	Kr III Ca VI	6 2 8

λ	Symbol	I	λ	Symbol	l l
579,75 579,40 579,212 579,11 578,82 578,732 578,604 578,386 578,220 578,107 578,09 577,737 577,444 577,30 577,153 577,108 577,01 576,900 576,8 576,738 576,419 576,266 576,076 575,902 575,716 575,633 575,582 575,580 574,650 574,650 574,650 574,650 574,634 574,37 574,279 574,065 573,468 574,37 574,279 574,668 573,388	Ne I Ne I Ar III Kr II Ne I Ca VI Ar III Kr III Kr III Kr III Kr III Kr III Cl VI Xe IV Ar III Kr III Kr III Cl VI Fe IV Kr III Cl III	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	570,881 570,636 570,529 570,291 570,025 569,830 569,759 569,156 569,13 568,418 568,04 567,794 567,676 567,629 567,679 566,630 566,613 566,613 566,490 565,879 565,879 565,698 565,640 565,879 565,480 565,289 565,272 564,514 564,529 564,514 564,529 564,514 564,529 564,514 564,529 564,514 564,529 562,55 562,895 562,992 562,577 562,55 562,690 562,577 562,55 562,498 562,355 562,28 562,28 562,28 562,28 562,28 562,28 562,28 562,28	C! VI F IV Cl VI Ca III Cl VI Ne V Ne V Kr III Kr VI Ne V Xe IV F III F III F III F III Cl VI Cl II Cl VI Si III C III CI VI Si III C III	$\begin{bmatrix} 0 & 14 & 2 & 2 & 4 & 4 & 4 & 4 & 4 & 4 & 4 & $
571 ,376 571 ,302 570 ,738	Cl VI F IV Kr III	1 14 4	561,689 561,680 561,670 561,530	Si IV Cl III Ca III Cl III	1 7 3 7

λ	Symbol	I	λ	Symbol	1
561 ,518 561 ,378	Ca III Ne VII	3 2 5	551 ,643 551 ,371	Cl V Ar VI	1 8
560 ,986 560 ,788 560 ,636	Kr III Kr II Cl III	5 3 1	551 ,117 551 ,103	Cl V Ca V	2 2
560 ,443 560 ,390	C II Al III	5 7	550 ,896 550 ,706 550 ,481	Ar II Cl IV Ar II	1 3 1
560 ,244 560 ,224 559 ,947	C II Ar II Ne VII	$rac{4}{2}$	550 ,355 550 ,323	Cl VI K II	5 1
559 ,760 559 ,320	N II Kr II	0 4	550 ,2 550 ,020 550 ,004	Cs III Cl IV Ca III	2 4 3
558,66 558,634 558,61	Xe IV Kr III Ne VII	15 4	549 ,568 549 ,507	C II	3 5
558,602 558,595	Ca V Ne VI	10 5	549 ,375 549 ,317 549 ,219	C II C II Cl IV	4 3 5
558 ,48 1 558 ,385	Ar V Cl III Ar III	5 1 5	549 ,201 549 ,070	Ca III Ca V	4 3
558 ,321 558 ,14 557 ,118	Cl II Cl III	1 7	548 ,905 548 ,781 548 ,652	Ar VI Ar II Kr III	5 2 5
557 ,112 557 ,029	Ca III K VI Ar III	3 1 6	548 ,517 548 ,324	F II F II	$\frac{2}{3}$
556 ,893 556 ,817 556 ,605	Ar II Cl III	$\frac{2}{7}$	547 ,898 547 ,873 547 ,813	Ca VI F II N II	3 4 0
556 ,583 556 ,232 556 ,215	Ca III Cl III Ca III	$\begin{matrix} 3 \\ 6 \\ 2 \end{matrix}$	547 ,8 547 ,630	Cs III Cl V	2 10
555 ,764 555 ,639	Ar II Ar VI	1 4	547,456 547,288 547,169	Ar II C II C II	$\begin{smallmatrix}2\\0\\0\end{smallmatrix}$
555 ,580 555 ,485 555 ,482	Cl VI Cl VI Ca V	$\begin{array}{c} 3 \\ 20 \\ 5 \end{array}$	547 ,166 546 ,846	Ar II F II	2 6
555 ,262 555 ,121	O IV O II	16 5 5	546,686 546,547	Kr III Kr III Cl V	5 6 6
555,056 554,794 554,655	O II Kr III C III	5 7 2	546 ,329 546 ,175	Ar II K II	$\frac{2}{3}$
554,619 554,615	Cl IV Ca III	7 3	546 ,123 545 ,114 545 ,091	Cl V Ca III	10 2 4
554 ,52 554 ,514 554 ,275	Kr VI O IV O III	5 18 0	544,731 544,627	Ar VI K V K V	1
554 ,210 554 ,074	Cl V O IV	1 17	544 ,537 544 ,413 544 ,03	Kr III Kr VI	5 5
553 ,470 553 ,328 553 ,297	Ar III O IV Cl IV	$\begin{array}{c} 9\\16\\6\end{array}$	543 ,973 543 ,891	K IV Ne IV	150
553 ,123 552 ,908	Ar II Cl III	1	543 ,818 543 ,730 543 ,640	Cl V Ar II K IV	1 2 2 3
552 ,053 552 ,017	Cl VI Cl IV Ca	$egin{array}{c} 2 \ 7 \ 4 \end{array}$	543 ,475 543 ,420	C II Kr III	
552 ,005 551 ,992 551 ,894	Cl VI C II	10 0	543 ,291 543 ,205 542 ,911	C II Ar II Ar II	8 2 2 2
551,694 551,689	Kr III	4,	542,868	Cl V	4

		·			
λ	Symbol	I	a	Symbol	1
542,842 542,395 542,297 542,296 542,290 542,299 542,073 541,284 541,127 540,860 540,788 540,0 539,853 539,731 539,547 539,441 539,086 538,977 538,967 538,788 538,681 538,681 538,648 538,595 538,150 538,119 538,318 538,312 538,312 538,318 538,312 538,318 538,319 537,606 537,461 537,459 537,459 537,006 537,006 537,006 537,006 537,004 536,965 536,790 536,745 536,532	Ca Cl V Cl V Si IV Ca V Cl V Ne IV Cl V Ne IV Kr III Li III O II Ne IV K II O II Cl V O II Cl V Ca IV Kr III Cl V Ca IV Cl IV Kr III Cl V Ca IV Cl IV Kr III Cl V Ca IV Cl IV	3 3 6 5 10 8 1000 3 800 4 5 7 3 3 8 0 8 8 3 2 6 4 3 4 8 7 13 100 12 6 11 5 9 6 9 3 6 1 2000 4 2 1 2 8 3 3	535,039 534,873 534,727 534,715 534,26 534,059 533,809 533,726 533,644 533,577 533,504 532,716 532,413 531,917 531,775 531,255 531,18 530,494 530,386 530,306 530,306 530,303 530,290 530,268 530,303 530,290 529,860 529,713 529,900 529,860 529,713 529,713 529,7 529,405 529,405 529,343 529,746 529,405 529,343 528,879 528,811 528,746 528,730 528,730 528,519 528,746 528,730 528,519 528,7617 527,665	Cl IV K V Cl IV Ca III Ar III K N II N II N II N II N II Ar III C II Ar III C II Kr III C II Kr III C II Kr III K III N II N II N II N II N II N II	42 84 124 64 54 1 37 104 114 66 33 29 5 83 03 33 143 02 863 1
536,531 536,216 536,150 536,132	Ca IV Ķ V Cl IV Ca III	2 2 6 4	527,565 527,064 526,870 526,60 526,497 526,457	K III K IV Ar VIII Fe IV Ar II Ar VIII	2 1 6() 1
536,132 536,008 535,916 535,666 535,647 535,580	Ca III Ca VI Cl V Cl IV Ca IV Ar III	7 0 2 7 4 7	526,457 526,448 526,298 526,28 525,795	Ar VIII K IV F V Fe IV O III	5 4 3 75 18
535,455 535,288 535,287 535,204	Cl V C III K V F VI	2 10 1 10	525,687 525,68 525,292 524,683 524,597	Kr III Fe IV F V Ar II F V	100 3 1 2

λ	Symbol	I	λ	Symbol	I
524,189 524,11 523,792 523,661 523,001 522,791 522,288 522,2128 522,2128 522,090 521,813 521,742 520,611 520,493 519,723 519,610 519,429 519,372 519,329 518,910 518,249 518,249 518,242 517,937 517,250 517,00 516,384 516,348 515,653 515,640 515,6165	Ar V Ti VI K III F III K IV Ar II F III He I Ar V Ne IV K III K O VI O VI Ar VIII K VI Ar II Ar II K II O II Ar V Xe VIII Kr III Si IV K II O II	5 10 5 4 5 4 5 1 3 80 3 25 25 10 3 2 2 3 5 1 1 3 5 4 0 2 2 3 5 4 0 2 2 3 5 4 0 2 2 3 5 4 0 2 4 0 2 4 0 2 4 0 2 4 3 5 4 0 2 4 3 5 4 4 3 5 4 4 3 5 4 4 5 4 5 4 5 4 5	509,018 508,903 508,700 508,6431 508,655 508,595 508,595 508,434 508,434 508,482 508,079 507,7178 507,683 507,391 507,0576 506,5702 506,2000 506,163 506,160 506,057 506,029 505,985 505,9122 505,961 505,6840 505,199 505,013	N II N II N II He I Ar III Ti VI N II Ar III F III O III F V He I O III He I He I He I K IV N II K IV He I Ca VI Ar II	0 0 0 2 20 2 4 12 0 9 10 18 4 15 17 16 10 7 5 3 3 2 2 2
515,514 515,320 515,498 515,118 514,945 514,943 514,350 514,310 514,087 513,975 513,914 513,845 513,649	K III K V O II Si IV F II K III Na V Ar II F V F V Ar V N II F II	4 1 5 2 6 2 0 1 1 2 1 2	503,649 502,157 501,649 501,184 500,798 500,343 500,125 500,047 499,993 499,871 499,583 499,530 499,462	Ar II Ar II K VI Ar II O II K IV K IV K IV C III C III C III	0,5 1 2 0,5 0,5 1 3 2 2 2 7 9
512,769 512,0982 511,886 511,565 511,527 511,497 511,215 511,193 510,757 510,554 510,102 509,9979 509,897 509,601 509,586 509,293	Ar III He I Ar V Ar III C III Ar III Al III Na V N II Ar II Na V He I N III K V N III Ca V	7 35 0 7 10 8 4 1 3 1 0 25 4 1 5 2	499,425 498,911 498,790 498,431 498,090 497,910 497,842 497,802 497,363 497,104 496,650 495,144 494,686 494,382 494,160 493,587	C III F IV F IV O VI C III F IV F IV F IV K III Ar II Na VI Na VI C III	7 4 7 1 0 1 4 6 5 15 0,5 6 0,5 7

λ	Symbol	I	λ	Symbol	I
493,519 493,464	C III	5 5	483 ,752 483 ,745	O II K V	4 4
493 ,396 493 ,364 493 ,341	C III C III	5 5 5	483 ,733 483 ,618	C III C III	5 4 3
492,649 492,228	C III Ar III	7 3	483 ,567 482 ,987 482 ,706	C III Ne V K V	50 4
491 ,980 491 ,714 491 ,340	O III O III Na VI	1 0 6	482 ,548 482 ,408 482 ,107	Ar III K III K III	$\begin{matrix} 8 \\ 2 \\ 2 \end{matrix}$
491 ,240 491 ,121	Na VI Ar III	3 4	482,107 482,1 481,848	Li III Ar III	$\frac{2}{6}$
491 ,062 491 ,050 490 ,997	K VI Ne III F IV	2 9 16	481 ,755 481 ,704 481 ,635	O II O II O II	3 1 0
490,698 490,68 490,566	Ar II Ar III F IV	0,5 3 13	481 ,587 481 ,587	III O II O	4 4
490,546 490,423	Ca III K VI	2 2	481 ,381 481 ,361 481 ,354	O III Ne V O III	$\begin{array}{c}2\\25\\3\end{array}$
490 ,310 489 ,641 489 ,580	Ne III Ne III Na VI	7 4 5	481 ,313 481 ,281	K. VI Ne V	2 15
489 ,501 489 ,196	Ne III Ar II	10 0,5	480 ,965 480 ,955 480 ,471	K III O III Ca	1 4 3
488 ,868 488 ,782 488 ,452	Ne III Ar II Ar III	7 0,5 7	480,406 480,397	Ne V K VI	25 1
488 ,120 488 ,103	K VI Ne III	10 8	479 ,485 479 ,379 479 ,185	Ar VII Ar VII K III	2 12 8
487 ,988 487 ,070 487 ,025	Ar III Ne V Ar III	7 3 7	478 ,305 477 ,625	Ca III C III	4 3
486 ,95 486 ,172 486 ,160	Al III Cl IV	1 8	476 ,606 476 ,432 476 ,201	Ca V Ar III Cu	$\begin{array}{c}2\\7\\20\end{array}$
485 ,857 485 ,359	Ca N II K IV	3 0 2 3	476 ,201 476 ,029 475 ,876	K II N II	2 1
485 ,636 485 ,631 485 ,626	Ca O II K II	$\frac{3}{4}$	475 ,800 475 ,733 475 ,697	N II Ar VII N II	$\begin{array}{c} 3 \\ 2 \\ 2 \end{array}$
485 ,572 485 ,515 485 ,515	O II Ar III O II	1 4	475,656 475,638	Ar VII N II	8 1
485 ,513 485 ,465	K II O II	5 3 0	474 ,920 474 ,883 474 ,774	K III N II N II	9 2
485 ,359 485 ,150	K IV Ar III	2 6	474,698 474,601	N II N II	0 0 0
485 ,086 485 ,084 484 ,600	O II K II F II	6 5 8	474,540 474,493 473,038	N II N II	0
484 ,445 484 ,368	Ar III Ca	5 3	473 ,938 473 ,918 473 ,207	Ar VII Ar III K VI	$\begin{matrix} 4 \\ 6 \\ 2 \end{matrix}$
484 ,200 484 ,116 484 ,025	K III Ar III O II	1 5	473,025 473,021	Ar III F II	6 3 5
484 ,025 483 ,976 483 ,972	O II K III	2 5 3	472 ,710 472 ,392 472 ,347	F II N III Cu	5 5 20
051					

	Symbol	1	λ	Symbol	I
472,232 472,16 471,990 471,949 471,603	N III Kr V F II F II O IV	4 3 6 3	463 ,011 462 ,596 462 ,415 462 ,388	Cl IV K V Ar V Ne II	3 1 3 14
471 ,569 471 ,273 470 ,408 470 ,089	K III O IV O II K III	15 1 4 20	462,146 462,007 461,898 461,737 461,227	Ar VI Ar VI Ar VI K VI Ar VI	4 25 1 3 6
469 ,968 469 ,865 469 ,831 469 ,817 469 ,499	Ar III Ne IV Ar III Ne IV K II	4 200 4 200	461 ,227 461 ,085 461 ,051 460 ,725	Ar V Ca Na V Ne II	6 5 10 15
468,956 468,766 468,467 468,447	Ar III O II Ar III K V	3 2 4 2	460,438 460,202 460,058 460,050 459,897	K VI Ar VI Ar VI C III Na V	8 1 1 8 7
467,926 467,390 467,194 467,106	O II Ar III Cl IV Cu	0 6 3 15	459,896 459,881 459,728 459,633	O III Cu Ar V C III	1 15 1 15
466 ,995 466 ,932 466 ,793 466 ,536 466 ,530	F V Ar VI K III C II Ar III	5 4 15 0 5	459,603 459,521 459,462 459,320 459,005	Ar VI C III C III Ar VI K V	3 14 13 10 3
466,492 466,404 466,358 466,132	C II C II CI IV	2 1 0 3	458,975 458,422 458,455 458,121	Ar V O II Si IV Ar V	2 0 3 3
466 ,129 465 ,978 465 ,760 465 ,586	Si III F V O II Ar VI	4 7 2 2	458,048 458,039 457,818 457,475	K VI Ar VI Si IV Ar VI	7 1 4 20
465 ,529 465 ,374 465 ,350 465 ,27 465 ,21	O II F V Cl IV Kr VI Ne VII	1 6 3 6 10	457,444 457,323 457,245 457,177	Cl III K VI Cl III F II	0 1 2 6
465 ,113 465 ,078 464 ,861 464 ,830	F III K II Cl IV Ca III Cu	10 1 4 3 20	457,169 457,007 456,997 456,981	Cl III Ar VI O II Ca IV	3 5 1 5
464 ,824 464 ,785 464 ,640 464 ,370	O II Cu F V O II	3 20 5 1	456 ,895 456 ,375 456 ,344 456 ,328	Ne II Ar VI Ne II K IV	5 3 4 8
464,310 464,292 464,284 464,270 464,257	Cl IV F III K VI Ar VI	3 9 10 4	456,328 456,078 455,813 455,670 455,6	K V N III Ar VI K V Li III	4 1 2 1
464,257 464,194 463,938 463,737 463,712	O H Ar V N IV Cu	2 7 3 20	455,270 454,648 454,112 454,072	Ne II Ne II Si IV Ne VI	$\frac{7}{5}$

λ	Symbol	I	λ	Symbol	I
453 ,340 453 ,257 453 ,130 452 ,900	N II N II Cu K V	1 0 20 3	442,518 442,300 442,048	K IV K IV O II	2 4 4 2
452 ,745 452 ,667 452 ,654	Ne VI K VI Cu	3 3 30	442,043 442,001 441,812 441,398	K III O II K II Cl III	2 4 5 3
452,227 452,226 451,869	K V N III N III	2 11 10	441 ,370 441 ,0 440 ,905	K VI Li III K IV	$\frac{3}{4}$
451 ,843 451 ,320 451 ,152	Ne VI K VI Cu	2 2 25	440,60 440,598 440,552	Ne VI O II O II	$egin{array}{c} 0 \ 2 \ 3 \end{array}$
450,732 450,565 450,20 450,08	C III Ca IV Kr VI N V	9 10 2 3	440,429 440,404 440,266 440,245	K III Ne VI Na VI Cl IV	15 1 3 2
450 ,079 450 ,015 449 ,708	Ar V Cu K V	$\begin{array}{c} 1 \\ 25 \\ 4 \end{array}$	439 ,700 439 ,255 438 ,930	Ca IV Ce IV Ca IV	5 3 4
449 ,493 449 ,065 449 ,013	Ar V Ar V K V	4 18 3	438 ,910 438 ,869 438 ,647	C II K III K V	1 4
449,013 448,595 448,420 447,840	K VI K III Cu O VI	3 15 25 0 8	438 ,023 437 ,825 437 ,773 437 ,683	K V Cl IV Ca IV O II	2 5 4 5 3
447 ,813 447 ,712 447 ,527 447 ,085	Ne II O VI Ar V K V	0 4 3	437 ,332 437 ,271 437 ,216	O II Ca IV K III	3 2 3
446 ,995 446 ,949 446 ,926	Cu Ar V K	25 8 2 5	436,85 436,649 436,563	N V O II F II	4 () 1
446,830 446,591 446,252 446,036	K II Ne II Ne II Ca V	7 8 1	436 ,510 436 ,279 435 ,676 435 ,649	O II F II K III Ne VI	$egin{array}{c} 1 \\ 2 \\ 10 \\ 4 \end{array}$
446,009 445,997 445,933	K VI Ar V Ca V	4 5 1	435 ,634 434 ,975 434 ,840	F II O III O III	3 10 2
445 ,878 445 ,638 445 ,607 445 ,601	K V O II K IV O II	1 4 4 4	434 ,722 434 ,646 434 ,570	K III O III Ca IV	15 3 12
445 ,190 445 ,046 445 ,032	Na V Na V Ne II	7 6 7	434,280 434,256 434,246 434,129	N III O III N III N III	6 4 6 5
445 ,018 444 ,999 444 ,766	Ca IV Cu Ca IV	1 15 3	434,066 434,014 433,911	N III N III N III	7 6 6
444,344 443,821 443,681 443,567	K III Ca IV O II K IV	15 15 0 6	433 ,774 433 ,664 433 ,337	CI III CI III	0 0 8
442,947 442,913	Cl III K III	2 3	433 ,237 433 ,176 432 ,919	Ne IV Ne VI Fe V	50 4 1
442 ,873 442 ,705	O IV	0 1	432 ,340 431 ,826	Fe V F II	3 2

λ	Symbol	I	λ	Symbol	I
431 ,545 431 ,541 431 ,472 430 ,909 430 ,758	F II Fe V Ne IV F II F IV	3 3 25 4 15	422,347 422,287 422,214 422,178 422,012	Ne V Fe V Ne V K V F II	5 6 15 5 1
430 ,624 430 ,218 430 ,177 430 ,154 430 ,053	Fe V F III O II F III Fe V	2 8 6 11 1	421,990 421,771 421,765 421,682 421,609	Cl III Cl III Fe V Fe V Ne IV	3 3 4 2 150
430,050 430,041 429,923 429,918 429,716	Ca III O II K II O II O II	1 6 3 5 4	421 ,465 421 ,446 421 ,045 420 ,951 420 ,874	Na VI K V Fe V Ne V Fe V	1 3 5 15 2
429,656 429,647 429,557 429,511 429,438	K II O II O II F III K VI	$\begin{array}{c} 3 \\ 5 \\ 2 \\ 10 \\ 2 \end{array}$	420,807 420,758 420,727 420,546 420,386	K VI N IV F IV Fe V Ne V	4 1 16 5 10
429,206 428,909 428,763 428,538 428,315	Fe V Fe V Fe V K VI K VI	1 5 5 2	420,041 419,915 419,731 419,714 419,644	FIV FeV KV CIV FIV	15 3 1 14 14
428,292 428,244 428,180 428,131 428,000	Fe V N III N III Fe V Fe V	0 5 6 3 0	419 ,525 419 ,310 419 ,045 418 ,910 418 ,812	C IV K V K V N III O II	13 2 2 6 0
427 ,918 427 ,840 427 ,782 427 ,442 427 ,320	Fe V Ne III Fe V Fe V	2 3 1 2 1	418,705 418,623 418,609 418,598 418,457	N III K III C III O II Fe V	7 6 2 1 5
427,190 426,969 426,814 426,745 426,609	Fe V Fe V Fe V Fe V	3 3 4 3 1	418 ,160 418 ,033 417 ,874 417 ,595	K VI Fe V F II Na VI	2 6 1 6
426,526 426,338 426,097 426,045 425,840 425,589	O II K VI Fe V Fe V Fe V	1 2 5 5 0 1	417,535 417,516 417,382 417,280 417,048	K III Fe V Fe V K IV Fe V	6 0 6 3 1
425,588 425,476 425,273 425,159 425,000	K V Fe V O II K V Ca V	7 1 0 5	416 ,910 416 ,834 416 ,769 416 ,509	Fe V Ne V C III K VI Fe V	2 25 5 1 5
424,75 424,733 424,61 424,577 424,28 423,833	N V Fe V N V O II Ti IV Fe V	$egin{array}{c} 2 \\ 3 \\ 1 \\ 0 \\ 3 \\ 2 \\ 2 \end{array}$	416,208 416,198 416,001 415,972 415,825	Ne V K III Fe V Fe V	80 6 3
423 ,821 423 ,58 422 ,713	Na VI Ti IV Cl III	2 4 1	415,793 415,505 415,465	K V Na VI K V	4 4 3 8

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λ	Symbol	I	λ	Symbol	I
415,333 415,196	Cl III	1 1	401 ,939 401 ,639	Ne VI Fe V	$\frac{25}{2}$
415,052 415,006	K V Fe V	5 4	401,138	Ne VI	15
414,870	K III	6	401 ,030 400 ,951	Fe V K VI	$\frac{2}{5}$
414,790 414,465	Fe V K V	$\frac{1}{3}$	$400,824 \\ 400,722$	Ca VI Na V	$\frac{3}{10}$
414,370 413,797	Na VI N III	$\frac{2}{0}$	400,676	MgVI	7
413,792	K III	10	400 ,625 400 ,579	Fe V F II	4 1
413,681 412,939	N III Si IV	0	400 ,210 399 ,995	K III Cl VI	8 8
412,790 412,289	K VI K III	1 5	399 ,957	Cl VI	7
412,240	Na IV	8	399 ,938 399 ,925	Cl VI Ca VI	5 0
412,155 412,080	Si IV K V	6	399 ,85 399 ,820	O IV Ne VI	4 5
411,958 411,812	C III Cl III	3 4	399 ,754	ΚV	4
411,373	Cl III	4	399 ,71 399 ,688	C III O IV	$\frac{2}{6}$
411,333 411,163	Na IV Cl III	7 3	399,637 399,634	C III Ar IV	$\frac{6}{3}$
410,540 410,371	Na IV Na IV	6 10	399,62	O IV	
410,102	KIII	8	399,50 399,400	O IV K V	$egin{array}{c} 2 \\ 3 \\ 3 \end{array}$
409,971 409,737	Ca III K III	18 8	399,289	Mg VI	6 1
409,615 409,325	Na IV C III	8 6	399,084 399,073	N III K VI	2
408,959	KIII	8	399,045	N III	4
408,682 408,076	Na IV K IV	8 5	398,885 398,878	N III K V	$\frac{3}{4}$
407,513 407,511	Cl III F II	0 4	398,86	Ar III	1
407,136	Ne II	8	398 ,633 398 ,551	K III C III	$\frac{3}{1}$
407,053 406,484	F II K III	$\frac{5}{6}$	398 ,546 398 ,363	Ar IV K V	4 4
406,274 $406,102$	Cl III K VI	$\frac{1}{2}$	398,168	CIII	1
405,852	Ne II	9	398 ,087 397 ,67	K VI Ar III	4 1
405,773 405,675	K IV K VI	$egin{array}{c} 2 \ 2 \ 4 \end{array}$	397 ,310 397 ,231	O III	0 1
405 ,644 405 ,475	F II K VI	$\frac{1}{4}$	397,178	Ca	4
405,333	KVI	$\frac{1}{2}$	397,120	O III	$\frac{2}{2}$
405,178	K VI	2	396 ,917 396 ,902	Ca VI Fe V	0
404,684 404,412	K VI K IV	4 3	396 ,869 396 ,773	Ar IV Fe V	4 3
403 ,732 403 ,372	Ca III O II	20 0	396,763	K III	0
403,315	Mg VI	8	396,382 396,38	Ca III Ar III	3 4
$403,273 \\ 403,262$	O II Ne VI	0 10	396 ,247 396 ,235	F III K VI	1 4
403,087 $403,035$	O II	0 0	396,055	Ca VI	
402,907	K III	6	395,968 395,92	F III Ar III	2 2 4
402,197 402,104	Fe V K III	1 4	395,789	Fe V	$egin{array}{c} 1 \ 2 \ 2 \end{array}$
404,104	1/ 111	*#	395,558	O III	2

λ	Symbol	I	λ	Symbol	I
395 ,442 395 ,395 395 ,155	F III K VI Fe V	3 5 3 3	386 ,737 386 ,710	Fe V K V	3 4
394,909 394,477	K V K VI	3	386 ,585 386 ,505 386 ,483	Fe V K VI Fe V	1 2 1
393 ,911 393 ,676 393 ,270	Fe V F II Fe V	4 1 5	386 ,256 386 ,254	Fe V Ca VI	0
393 ,142 392 ,907 392 ,467	K IV Fe V K IV	$\begin{array}{c} 10 \\ 6 \\ 4 \end{array}$	336 ,203 386 ,156 386 ,106	C III Fe V Ca VI	14 4 1
392 ,433 392 ,420 392 ,322	Cl V Ca III O II	$5\\2\\3$	385 ,941 385 ,869 385 ,740	Ca VI Fe V Fe V	1 5 5
392 ,274 392 ,002 391 ,943	K IV O II O II	$egin{array}{c} 2 \ 3 \ 2 \end{array}$	385 ,689 385 ,091 385 ,023	K V Ca VI Fe V	$egin{array}{c} 5 \ 2 \ 4 \end{array}$
391 ,918 391 ,912 391 ,462	K III O II K IV	4 1 4	385,020 384,957 384,956	K V Fe V K IV	1 6 3
390 ,574 390 ,415	K IV K IV Cl V	6 5 4	384 ,826 384 ,610 384 ,516	Fe V Fe V K V	1 2 2
390,148 390,137 390,114	Ca VI K III	3 5	384 ,400 384 ,212 384 ,178	K V Fe V C IV	2 3 17
390, 055 389, 750 389, 531	C III K VI K VI	3 2 2 2 7	384,170 384,172 384,095	Ca VI K IV	3 5
389 ,428 389 ,090 389 ,069	K V C III K V	5	384 ,032 384 ,028 383 ,505	C IV Ca VI Ca VI	16 2 2 3
389,069 389,005 389,965	K IV C III C III	5 6 5	383 ,484 383 ,318 382 ,906	Fe V K V K IV	3 2 6
388 ,920 388 ,607 388 ,500	K IV Fe V Fe V	$\begin{matrix} 3 \\ 2 \\ 2 \end{matrix}$	382,903 382,646 382,487	O III K IV K IV	1 4 3
388 ,485 388 ,233 388 ,218	K VI K VI Ne IV	$\begin{array}{c} 2\\4\\100\end{array}$	382 ,229 382 ,214	K III O III Fe V	6 1 4
388 ,020 387 ,983 387 ,800	Mg VI Fe V K V	3 3 6	381 ,881 381 ,849 381 ,702 381 ,671	Ca VI K IV Fe V	2 4 0
387 ,787 387 ,775	$egin{array}{c} ext{Mg VI} \ ext{Fe V} \end{array}$	2 4	381 ,606 381 ,467	Ca V Fe V Ca VI	3 0
387,639 387,616 387,500	O III Fe V Fe V	4 4 6 3	381 ,464 381 ,260 381 ,152	Fe V Fe V	2 3 2
387, 482 387, 398 387, 372	O III O III K III	$rac{2}{2}$	380 ,902 380 ,664 380 ,477	F II Fe V K IV	2 3 5 5
387 ,353 387 ,199 387 ,141	N IV Fe V Ne IV	4 5 125	380,477 380,396	K III Ca V Na III	5 5 8
387,080 387,077	Ca VI Ca V	4 5 4	380,107 380,003 379,919 379,877	Ca VI O IV K III	1 3 6
386 ,897 386 ,783	Fe V Fe V	4	379,775	O IV	4

λ	Symbol	I	λ	Symbol	1
379,765 379,631 379,575 379,505 379,326 379,326 379,328 379,294 379,279 379,138 379,118 379,065 379,032 378,745 378,653 378,663 378,563 378,563 378,563 378,745 376,219 378,143 377,763 377,766 377,263 377,756 377,263 377,756 377,263 377,756 377,263 377,756 377,263 377,756 377,763	Ca V O III O III O III Cu Ne III Fe V K IV Ca V K III Ca VI Ca VI F III F III Ca VI K V O II O II F II Na II Ca V K IV F II F	3 2 3 4 2 5 7 3 2 2 2 8 1 1 1 2 1 1 3 10 5 15 2 5 0 0 0 1 3 3 3 3 6 1 1 1 1 3 2 2 5 5 5 1 2	λ 373,700 373,418 373,318 373,165 373,074 372,904 372,774 372,589 372,462 372,148 372,069 371,784 371,747 371,694 371,225 370,580 370,523 370,115 370,022 369,743 369,472 369,472 369,472 369,473 369,472 369,475 367,378 367,378 367,371 367,378 367,371 367,192 366,391 366,240 366,110 366,001 366,710 366,001 366,788 365,878 365,878 365,878 365,878 365,878 365,634 365,614 365,594 366,400	Ca VI Ca VI Ca VI K V Cl V K V Ca V K VI Cl V K V Na II C III C III C III C III Ca V K V K V I Ca VI Na V Ca III C III K VI N I V I C III I V I V I V I V I V I V I V I V I V	3 5 3 2 2 6 4 2 4 10 6 8 8 10 10 6 3 3 2 2 2 2 2 2 6 0 4 4 3 7 6 1 3 3 100 6 6 1 100 6 100
374,441 374,436 374,331 374,31 374,240 374,204	N III O III O III N III Fe V N III	12 8 8 1 4 11	365,339 364,973 364,940 364,867 364,795	Fe V Fe V O III O III Fe V	3 3 1 2 4
374,240	${ m Fe}{ m V}$	4	364,795 364,739 364,477 364,292 363,864	Fe V O III Na VI Fe V C III	4 3 3 3 6
373,997 373,911 373,805 373,776 373,720	Ca VI Cl V O III Cl V Fe V	7 0 8 3 5	363 ,790 363 ,774 363 ,761 363 ,525 363 ,021 362 ,985	C III Na VI C III Ca VI K IV N III	5 2 4 2 3 6

λ	Symbol	I	λ	Symbol	
					1
362,946 $362,881$	N III N III	8 8	356 ,558 356 ,534	O III Ne II	$\frac{0}{3}$
362 ,833 362 ,788	N III Ca VI	7 1	356,436 356,372	Ne II K VI	2 1
362,612	Ca VI	4 4	356 ,260 356 ,246	K IV Ca V	3 5
362 ,456 362 ,444	Ne II Na VI	4	356 ,246	Ne II	4
362 ,154 362 ,085	K IV K IV	3 5	355 ,946 355 ,848	Ne II Ne II	2 1
361 ,838 361 ,645	Cu Ca VI	15 2	355,800 355,663	K VI K VI	1 1
361,427	Ne II Na VI	5 8	355,647	Ne II	3
361,250 361,234	Ca VI	2	355 ,469 355 ,469	K VI O III	1 5
361,220 361,114	Cu Ca VI	25	355 ,450 355 ,425	Ne II Cu	$\frac{2}{20}$
$360,761 \\ 360,675$	Na IV C III	6 5	355 ,333	O III	5
$360,635 \\ 360,623$	F IV C III	1 7	355 ,326 355 ,293	Mg V O III	12 3
360,618	Cu	30	355,137 355,133	O III K	$\frac{6}{2}$
360,568 360,367	K IV Na V	$\frac{2}{8}$	355,045	FIV	2
360,557 360,319	C III Na V	$\frac{6}{8}$	354 ,954 354 ,927	Ne II K V	4 6
359,907	K IV	4	354 ,927 354 ,627	K IV K V	6
359 ,873 359 ,730	Cu K IV	50 6	354,223	Mg V	10
359, 616 359, 415	O III	$\frac{1}{2}$	354 ,139 353 ,922	K IV Ne II	$egin{array}{c} 2 \\ 2 \\ 3 \end{array}$
359 ,385 359 ,384	Ne V O III	50 7	353,455 353,421	K F II	0
359,223 359,016	O III O III	8 8	353,325	K Ma V	3
359,865	Cu	90	353,300 353,206	Mg V Ne II	9 3
358 ,740 358 ,721	C III Ne IV	$\frac{4}{200}$	353,094 353,031	Mg V Cu	14 15
358 ,578 358 ,509	N III N III	6 5	353,000	CIII	3 4
358,472	Ne V	50	352 ,946 352 ,915	Ne II Ca V	9 2
358 ,469 358 ,401	N III N III	5 3	352 ,750 352 ,463	K V K V	2
358 ,356 358 ,327	N III N III	3 5 5	352,237	Ne II	2 10
358 ,278	N III	3	352,202 352,058	Mg V N IV N III	4 1
358, 153 357, 973	Ca VI Ca III	3 8	351 ,979 351 ,931	NJV	5 12
357 ,955 357 ,897	Ne V Cu	40 100	351 ,089 350 ,878	Mg V Ar V	3
357 ,831	Ne IV K VI	50 3	350 ,703 350 ,394	O III Ca VI	8 1
357,685 357,645	K VI	3	350,334 350,330 350,164	C III K VI	$\frac{1}{2}$
357,534 356,795	Ne II Ne II	5 5 0	349,964	Cu	30
356 ,768 356 ,725	O III	2	349 ,961 349 ,918	O III O III	1
356,625	O III K VI	1 3	349 ,825 349 ,793	O III K V	2 .3 3
356,615	17 A I	U	,, 010,100	~~ '	96

	λ	Symbol	I	λ	Symbol	J
	349,504 349,494 349,494 349,155 348,800 348,690 348,650 348,413 347,999 347,967 347,854 347,777 347,431 347,334 347,005 346,688 346,372 346,335 346,004 345,545 345,407 345,405 346,888 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,958 344,970 345,407 345,405 346,805 347,713 342,407 344,419 343,933 343,931 343,892 343,640 344,488 344,470 344,488	K V Ca VI Mg VI Ca VI N III N III Ca VI Cu K III Ca VI C III	4 10 10 10 0 15 3 3 3 3 1 1 4 3 4 2 60 2 2 90 10 3 2 4 3 4 6 4 2 5 4 7 4 4 3 4 6 6 6 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4	341 ,143 340 ,745 340 ,528 340 ,462 340 ,389 340 ,286 340 ,037 339 ,940 339 ,886 339 ,800 339 ,773 339 ,463 339 ,436 339 ,420 339 ,330 339 ,009 338 ,929 338 ,828 338 ,426 338 ,345 338 ,345 338 ,345 338 ,314 338 ,222 338 ,161 338 ,222 338 ,161 338 ,056 337 ,555 337 ,541 337 ,257 336 ,555 337 ,541 337 ,257 338 ,555 336 ,555 336 ,555 336 ,555 337 ,541 337 ,257 338 ,555 337 ,541 337 ,257 338 ,555 337 ,541 337 ,555 336 ,555 336 ,555 336 ,555 336 ,555 337 ,541 337 ,257 338 ,910 333 ,857 333 ,910 333 ,857 333 ,570 333 ,562 333 ,438 333 ,057 332 ,893 332 ,580 332 ,531 332 ,531 332 ,327	C III K IV Ca VI K IV Ca III Ca IV Ca VI Ca VI Ca VI Cu Ar V Ca IV Cu O IV Ar V Ca IV Ar V N III Cu Ar VIII K VI Ca V Ar V Ar V Ar V Ar V Ca IV Ar V Ca IV Ca IV Ca IV Ca IV Ca V Ar V III Ca V Ar V Ar V Ca V Ar V III Ca V Ar V Ca V Ar V III Ca IV Ca V Ca V Cu	5 3 8 6 3 4 4 4 30 3 5 1 6 0 15 1 3 5 4 2 2 2 5 0 3 5 6 3 4 2 15 3 4 2 2 5 5 5 3 11 20 6 30 3 9 3 4 30 4 2 100 3 8 5 100 3 5 100 3 8 5 100 3 5 100 3 5 100 3 5 100 3 5 100 3 5 100 3 5 100 3 5 100 3 5 100 3 5
000	341 ,242 341 ,183 341 ,179	C III Cu C III	$\begin{bmatrix} 7 \\ 20 \\ 6 \end{bmatrix}$	332 ,133 331 ,991 331 ,835	N III Ca IV Cl IV	3 2 5 2

λ	Symbol	I	λ	Symbol	1
331,50 331,442 331,416 331,468 331,06 330,937 330,77 330,718 330,687 330,684 330,637 330,62 330,20 329,851 329,805 329,851 329,307 329,298 329,116 329,053 329,047 328,973 328,973 328,973 328,983 328,845 328,831 328,742 328,737 328,536 328,448 328,442 328,488 328,442 328,686 327,784 327,663 327,660	Ne II Ca IV K III K V Ne II Ca V Ne II Na V C III K III C III Ne II Cu Ca IV K V Ca VI Ca IV K III Cu Cu I Cu I Cu I Cu I Cu I Cu I Cu	2 4 1 1 1 6 3 0 1 5 1 2 30 30 3 0 3 5 2 100 2 3 2 20 9 40 1 25 10 50 2 4 1 2 20	324,56 324,485 324,477 324,110 323,936 323,816 323,671 323,615 323,488 323,431 323,356 323,310 323,223 323,175 322,757 322,724 322,685 322,685 322,660 322,617 322,575 322,570 322,570 322,503 322,166 321,609 321,593 321,457 321,270 321,161 321,110 321,071 320,999 320,979 320,881 320,720 320,445	Ne II Cu Ca V Ca V Cl VI Cu N III N III N III N III N III Cl VI Mg IV Ca V N IV F III F III Cu C III N IV N IV Ca V Ca IV O IV N III N III Ca VI I III Cu C III N IV O III CA VI O III CA VI CA VI O III CA VI	2 70 5 3 20 60 4 6 5 4 15 18 6 7 5 9 7 8 15 8 8 7 10 6 10 1 1 2 1 1 20 12 1
327,620 327,605 327,519 327,383 327,376 327,33 327,320 327,25 327,176	K III O IV Cu K V Ne II O IV Ne II C III	1 0 15 4 3 1 2 4	320,445 320,392 320,250 320,192 320,004 319,996 319,993 319,695	Ca VI He I Cl IV F IV O III Cl IV F IV	10 1 1 2 3 0 3 10
327,175 327,112 327,031 326,77 326,575 326,54 325,687 325,570 325,282 325,278 325,161	Ca VI C III K V Ne II Cu Ne II Cu C III Ca V K III CI VI	2 4 2 3 20 5 20 1 5 0 25	319,616 319,513 319,266 318,969 318,750 318,392 318,364 318,093 317,641 317,319 317,265	C! IV CI IV C III K V CI IV Ca IV Fe VI Ca IV Na VI Fe VI O III	3 1 3 1 4 3 15 6
325,038 325,020 324,607	Cu Ca V Cu	20 3 50	316,998 316,967 316,947	F III O III Ca VI	2 3 3

λ	Symbol	I	λ	Symbol	I
316,823 316,488 316,389 316,115 315,748 315,539 315,537 315,506 315,221 315,181 315,053 315,027 314,877 314,877 314,876 314,715 314,676 314,554 314,395 314,299 313,748 313,677 313,048 312,770 312,608 312,505 312,455 312,455 312,418 312,311	F III F III Ca VI Ca VI F III F III F III K V Fe VI F III K V N IV Fe VI N III N III Fe VI N III Fe VI N III K U N III Fe VI C III Fe VI Na VI C III Ne III K V Na VI C IV C IV Mg V Fe VI	3 4 0 3 6 7 3 8 4 8 4 8 4 6 9 1 8 4 3 1 3 4 5 3 4 5 3 4 5 3 1 4 5 3 1 5 3 1 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	308,534 308,383 308,306 308,264 308,187 308,129 308,051 308,007 307,806 307,806 307,800 307,404 307,375 307,248 307,152 307,013 306,922 306,882 306,823 306,621 306,620 306,460 305,879 305,837 305,836 305,769 305,703 305,656 305,596 305,200	Fe VI Fe VI O III Na V Fe VI K O III Fe VI Fe VI Fe VI Fe VI Fe VI Al VI Na V Fe VI Fe VI O IV Fe VI O IV Fe VI O IV Te VI O IV Te VI O IV Te VI O IV Te VI	4 2 2 10 2 2 1 3 0 1 3 3 4 7 8 2 5 7 2 8 2 1 1 4 1 8 1 1 8 1 1 8 1 1 8 1 8 1 8 1 8
312,241 311,921 311,726 311,702 311,679 311,628 311,539 311,490 311,415 311,243 311,236 311,138 310,908 310,807 310,727 310,601 310,380 310,274 310,171 309,852 309,627 309,596	Al VI Na VI O IV Fe VI O IV N III N III O IV F III K V Fe VI Fe VI Al VI Fe VI Cu Fe VI Cu Fe VI Cu Fe VI Cu Fe VI Al VI Al VI	6 4 3 7 6 3 2 5 4 6 0 15 4 20 5 7 6	304,912 304,910 304,874 304,818 304,551 304,330 304,221 304,032 303,981 303,799 303,783 303,693 303,693 303,691 303,558 303,515 303,468 303,460 303,432 303,411	Fe VI N III Ca IV N III N III Fe VI Ca IV Fe VI N III N III N III O III He II O III K O III Fe VI O III C III C III O III C III	4 3 3 4 4 7 3 7 2 2 2 9 500 7 2 7 4 7 1 7
308,993 308,960 308,664 308,560 308,559	Fe VI Fe VI Fe VI Al VI Ne III	3 3 5 6 1	303 ,163 303 ,123 303 ,079 303 ,048 303 ,023	N IV N IV N IV N IV K VI	4 6 4 5 1

303,009 N IV 4 295,634 Fe VI 4 302,657 K VI 2 295,619 O III 5 302,28 Na II 0 295,511 O III 3 301,741 Ca III 4 295,365 F III 1 4 295,365 F III 1 4 295,365 F III 2 293,405 F III 2 293,405 F III 2 293,405 F III 3 301,232 Ca III 3 295,042 Fe VI 2 294,265 Fe VI 4 4 4 4 4 4 4 4 4					,	
302, 28 Na 11	λ	Symbol	I	λ	Symbol	I
300 28 Na II 0 295 511 O III 3 3 301 741 Ca III 4 295 505 F III 1 2 2 301 741 Ca III 4 295 505 F III 1 2 3 3 301 741 Na II 0 295 514 O IV 1 3 301 301 Na II 1 1 2 295 505 O IV 1 3 301 243 C III 3 2 295 5042 Fe VI 4 4 3 301 742 Na III 2 2 395 5042 Fe VI 4 4 3 301 742 Na III 2 2 395 5044 Fe VI 4 4 3 301 742 Na III 3 2 295 5044 Fe VI 4 4 3 3 3 295 5042 Fe VI 4 4 3 3 3 3 3 5 5 5 6 7 8 7 8 7 8 8 7 8 9 8 9 8 9 8 9 8 7 8 VI 1 2 2 9 8 5 3 0 IV 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						
301,741				295,619	O 111	
301,432 Na II 1 235,365 F III 2 301,311 Na II 0 295,140 O IV 1 301,279 C III 1 2 295,051 O IV 1 301,206 C III 3 295,042 Fe VI 2 301,206 C III 2 295,042 Fe VI 4 4 301,139 Ca V 0 294,960 Fe VI 4 301,139 Ca V 0 294,960 Fe VI 4 300,301,139 Ca V 0 294,960 Fe VI 4 300,303 K V 6 294,850 Fe VI 4 300,305 K V 6 294,836 K V 6 300,316 N IV 3 294,650 O IV 1 2 294,390 Ne IV 3 294,850 Fe VI 7 300,151 Na II 1 294,295 Fe VI 7 300,151 Na II 1 294,295 Fe VI 7 7 299,803 Fe VI 1 294,300 Ne IV 3 299,850 O IV 4 294,300 Ne IV 3 299,850 O IV 4 294,300 Ne IV 3 299,850 O IV 4 294,400 Ne IV 3 299,870 N III 0 294,400 Ne IV 3 299,870 N III 0 294,400 Ne IV 3 299,495 O IV 2 294,505 Fe VI 0 299,495 O IV 2 294,505 Ar VI 6 299,495 O IV 2 299,495 O IV 3 293,820 Fe VI 0 299,495 O IV 3 293,820 Fe VI 0 299,495 O IV 3 293,820 Fe VI 0 299,495 O IV 3 293,847 Ne IV 1 299,275 O III 2 293,384 Fe VI 4 299,275 O III 2 293,384 Fe VI 4 297,745 Fe VI 8 299,275 O III 2 293,384 Fe VI 4 297,745 Fe VI 8 297,768 N IV 3 293,332 K VI 2 297,768 N IV 3 293,332 K VI 2 297,768 N IV 3 293,332 K VI 3 297,768 N IV 3 293,332 K VI 2 297,768 N IV 3 293,332 K VI 2 297,768 N IV 3 293,332 K VI 3 297,768 N IV 3 293,332 K VI 3 297,768 N IV 4 293,214 Fe VI 4 297,714 Ar VII 6 297,388 Fe VI 4 297,388 Fe VI 4 293,324 Fe VI 4 297,344 Fe VI 4 293,214 Fe VI 4 297,344 Fe VI 4 293,324 Fe VI 4 297,344 Fe VI 5 299,388 Fe VI 6 292,338 Fe VI 7 2 293,050 K VI 2 2 297,388 Fe VI 6 292,388 Fe VI 7 2 293,069 Fe VI 5 293,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 7 2 293,069 Fe VI 5 293,388 Fe VI 5 292,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 7 2 293,069 Fe VI 5 292,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 7 2 293,069 Fe VI 5 292,388 Fe VI 6 292,388 Fe VI 6 292,388 Fe VI 7 2 293,080 Fe VI 5 292,388 Fe VI 6 292,388 Fe VI 7 2 293,080 Fe VI 5 292,388 Fe VI						
301, 311 Na II 0 295, 140 O IV 1 301, 243 C III 3 295, 042 Fe VI 2 301, 206 C III 3 295, 042 Fe VI 2 301, 139 Ca V 0 294, 960 Fe VI 4 301, 124 Ne III 4 294, 853 O IV 1 300, 997 Fe VI 2 294, 850 Fe VI 4 300, 300, 455 O III 3 294, 665 Fe VI 4 300, 316 N IV 3 294, 665 Fe VI 4 300, 316 N IV 3 294, 665 Fe VI 4 300, 316 N IV 3 294, 650 O IV 1 300, 151 Na II 1 294, 320 Fe VI 3 299, 850 O IV 4 294, 339 Ne IV 3 299, 850 O IV 4 294, 339 Ne IV 3 299, 850 N III 1 1 294, 225 Fe VI 7 299, 803 Fe VI 1 294, 400 Ne IV 3 299, 800 O IV 2 294, 040 Ne IV 3 299, 670 N III 0 294, 040 Fe VI 0 299, 670 O IV 2 294, 040 Fe VI 0 299, 495 O IV 2 293, 966 Fe VI 0 299, 495 O IV 2 293, 966 Fe VI 1 299, 495 O IV 2 293, 966 Fe VI 1 299, 495 O IV 3 293, 820 Fe VI 0 299, 315 Ca IV 4 293, 745 Fe VI 1 299, 315 Ca IV 4 293, 745 Fe VI 8 299, 217 Cu 15 299, 301 Cu 20 293, 488 Fe VI 1 299, 315 N IV 5 293, 488 Fe VI 4 297, 768 N IV 3 293, 489 Ne IV 5 299, 315 N IV 5 293, 488 K V I 2 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 489 Ne IV 4 297, 768 N IV 3 293, 429 Ne IV 4 297, 768 N IV 3 293, 332 K VI 3 297, 568 Fe VI 7 293, 348 K VI 2 297, 768 N IV 3 293, 348 K VI 2 297, 768 N IV 3 293, 322 Fe VI 4 297, 768 N IV 3 293, 324 Fe VI 4 297, 768 N IV 3 293, 324 Fe VI 4 297, 768 N IV 3 293, 329 Fe VI 5 299, 306 Fe VI 7 293, 366 Fe VI 7 299, 568 Fe VI 7 293, 366 Fe VI 7 299, 568 Fe VI 7 293, 366 Fe VI 5 296, 587 C IV 6 292, 597 Fe VI 5 296, 588 Fe VI 6 292, 597 Fe VI 5 296, 588 Fe VI 6 292, 597 Fe VI 5 296, 587 C IV 7 7 293, 362 Fe VI 5 296, 587 C IV 6 292, 343 Fe VI 5 296, 587 C IV 6 292, 348 Mg VI 5 295, 586 Fe VI 7 292, 348 Mg VI 5 295, 586 Fe VI 8 295, 586 Fe VI 9 292, 348 Mg VI 5 295, 586 Fe VI 1 5 296, 608 Fe VI 5 292, 348 Mg VI 5 296, 607 C III 6 291, 330 C III 5 296, 607 C III 6 291, 330 C III 5 296, 607 C III 6 291, 330 C III 5 296, 607 C III 6 291, 330 C III 5						
301 243				295,140	O IV	1
301 206 C III 2 2 295,014 Fe VI 4 301,139 Ca V 0 0 294,960 Fe VI 4 301,139 Ca V 0 0 294,960 Fe VI 4 301,1424 Ne III 4 294,853 O IV 1 1 300,997 Fe VI 2 294,850 Fe VI 4 300,950 KV 6 6 294,850 Fe VI 4 300,503 KV 6 6 294,850 Fe VI 4 300,316 N IV 3 294,655 Fe VI 4 300,316 N IV 3 294,655 Fe VI 7 300,151 Na II 1 294,520 Fe VI 7 300,151 Na II 1 294,330 Fe VI 7 294,520 Fe VI 7 300,151 Na II 1 294,330 Fe VI 3 299,850 O IV 4 294,339 Fe VI 7 294,255 Fe VI 7 299,820 N III 1 294,265 Fe VI 7 294,000 Fe VI 0 299,620 O IV 2 293,347 Ne IV 1 2294,000 Fe VI 1 2294,000 Fe VI 1 2294,000 Fe VI 1 2293,347 Ne IV 1 2299,217 Cu 15 2293,249 Fe VI 1 2293,449 Ne IV 1 2297,815 N IV 3 2293,448 K VI 2 2297,768 N IV 3 2293,334 Fe VI 4 2297,768 N IV 3 2293,334 Fe VI 4 2297,768 Ar VII 6 2297,644 N IV 4 2293,224 Fe VI 4 2297,644 N IV 4 2293,244 Fe VI 4 2297,648 N IV 3 2297,648 N IV 3 2293,334 Fe VI 4 2297,648 N IV 4 2293,244 Fe VI 4 2297,644 N IV 4 2293,244 Fe VI 4 2297,658 Fe VI 8 2297,648 N IV 3 2293,332 K VI 3 2297,648 N IV 3 2293,334 Fe VI 4 2297,658 Fe VI 8 2297,668 Fe VI 8 2297,668 Fe VI 8 2297,668 Fe VI 8 2297,668 Fe VI 8 2297,368 Fe VI 7 2296,857 C IV 6 2292,447 N III 3 2293,244 Fe VI 4 1 2297,658 Fe VI 6 2292,595 N III 4 2296,858 Ca IV 6 2292,595 N III 4 2296,858 Ca IV 6 2292,595 N III 4 2296,858 Ca IV 6 2292,447 N III 3 2296,858 Fe VI 5 2293,438 Fe VI 5 2293,448 Mg VI 5 2296,858 Fe VI 6 2292,447 N III 3 2296,858 Fe VI 6 2292,368 Fe VI 5 2293,489 Fe VI 5 2293,489 Fe VI 5 2296,858 Fe VI 6 2292,368 Fe VI 5 2292,368 Fe VI				· ·		
301, 139			$\overset{\circ}{2}$			
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	295 ,657	0 111	р	n 291,229	10 41	

λ	Symbol	I	a	Symbol	I	
291,203 291,184 291,054 291,020 290,947 290,890 290,848 290,737 290,608 290,577 290,499 290,461 290,302 290,271 290,147 290,146 290,089 290,038 289,933 289,898 289,851 289,672 289,590 289,469 289,468 289,468 289,302 289,469 289,468 289,302 289,241 289,143 289,112 289,468 289,292 289,241 289,143 289,112 289,048 289,302 289,292 289,241 289,143 289,112 289,048 289,302 289,292 289,241 289,143 289,112 289,048 289,302 289,292 289,241 289,143 289,143 289,112 289,048 286,688 286,965 286,965 286,965 286,965 286,965 286,965 286,965 286,934 286,688 286,448 286,127 286,038 285,838 285,734	O IV Fe VI O IV Fe VI F III Fe VI F IV Fe VI F IV Fe VI F IV Fe VI Fe VI Fe VI O IV Fe VI C IV O IV Fe VI C IV O IV Fe VI C IV O IV C IV O	16155 26424 22356 44441 24214 23431 95304 13130 95156 20271 655	283,770 283,765 283,690 283,579 283,470 283,420 283,420 283,420 283,178 283,164 282,96 282,827 282,556 282,440 282,423 282,423 282,213 282,213 282,213 282,213 282,213 281,915 281,81 281,744 281,492 281,433 281,397 281,390 281,350 281,207 280,992 280,905 280,522 280,483 280,412 280,328 280,4265 280,483 280,412 280,328 280,416 280,043 280,010 279,937 279,834 279,787 279,692 279,633 279,456 278,699 278,471 278,339 278,449 278,128 277,951	Fe VI K IV Ne III N IV	52 52 512 111 106 53 101 020 63 1 214 140 50 314 24 38 121 113 113 113 113 114 315 316 316 316 316 316 316 316 316 316 316	
284 ,794 284 ,504 284 ,346 284 ,296 283 ,894	Ca V Fe VI N III N III Ne III	2 4 2 1 3	277,610 277,569 277,514 277,394 277,385	Fe VI Fe VI O III K V O III	2 6 1 3 7	
100			•	_	-	

λ	Symbol	I	λ	Symbol	I
276,947 276,895 276,786 276,581 275,513 275,366	Fe VI F III F III Mg V O III	3 4 5 16 4 3	268,986 268,817 268,785 268,773 268,623 268,583	Mg VI F IV F IV Cu Na III Ca V	10 1 4 50 5
275,350 275,281 275,10 274,601 274,552 274,260	Al VI O III Na II Cu K IV F III	6 2 0 15 3 6	268,451 268,309 267,952 267,868 267,851 267,772	O III Cu N III Na III N III Ca V	1 60 1 6 0 8
274,051 273,99 273,546 273,417 273,207 273,065	C III Na II K IV Cu F III K IV	2 0 1 20 2	267,709 267,642 267,562 267,516 267,121 267,059	Ne III Na III Cu Ne III O III Ne III	2 8 25 3 4 3
272 ,982 272 ,915 272 ,758 272 ,740 272 ,441 272 ,424 272 ,336	Ca V F III F III F III Na III Cu Ca V	4 3 3 4 0 15 3	267,050 267,036 267,030 266,985 266,967 266,967	O III K O III O III O IV O III	3 2 7 7 5 6
272 ,311 272 ,270 272 ,265 272 ,174 272 ,125 272 ,076	O IV O IV Ca V O IV O IV	6 6 5 7 7 6	266 ,938 266 ,932 266 ,893 266 ,863 266 ,729 266 ,690 266 ,378	K O IV Na III Ca V O IV O IV N V	2 6 5 3 0 0 9
271,989 271,820 271,611 271,523 271,443 271,440	O IV K IV O III O III Cu Ca V O III	6 3 0 1 20 1 1	266,344 266,197 266,061 265,641 265,550 265,062	K V V Cu Cu O V O IV	4 8 20 50 4 0
271 ,403 271 ,141 271 ,014 271 ,01 270 ,995 270 ,982 270 ,740	Ca V C III Na II N IV O V Cu	4 1 0 6 0 20	264 ,948 264 ,837 264 ,480 264 ,478 264 ,414	N III N III O III K V Cu	2 1 6 2 20
270 ,675 270 ,583 270 ,570 270 ,494 270 ,394	F III C III Ca V Ca V Mg VI Ca V	4 1 2 3 12 6	264,339 264,338 264,257 264,029 263,903 263,861	K V O III O III Cu O III	2 5 4 15 0
270,305 270,298 270,225 269,98 269,653 269,559	Cu F IV Na II Cu O IV	30 6 0 20 1	263,819 263,818 263,807 263,768 263,760 263,728	K IV O III F III O III Cu O III	2 5 8 3 30 4
269 ,225 269 ,076 269 ,044	F IV F IV Cu	$\begin{array}{c}2\\3\\40\end{array}$	263 ,716 263 ,692 262 ,938	K IV O III Cu	2 3 30

262,882						
262,729 O III O 255,865 F III 7 262,533 C IV 3 255,725 F III 6 262,533 C IV 3 255,725 F III 5 262,289 O III 0 255,624 F III 1 262,289 O III 0 255,477 Cu 35 262,413 O III 2 255,302 O III 0 261,806 Cu 20 255,252 O IIV 5 261,751 F III 6 255,244 Cu 45 261,761 F III 7 255,158 O III 1 261,666 Cu 30 255,244 O III 0 261,666 Cu 30 255,044 O III 0 261,028 K II 1 254,772 Cu 70 261,028 K II 1 254,772 Cu 70 261,028 K II 1 254,772 Cu 70 261,028 F III 1 254,595 F IV 1 261,027 O III 4 254,595 F IV 1 261,027 O III 4 254,595 F IV 2 260,782 F III 1 254,493 F III 3 260,488 F III 3 254,493 F III 3 260,488 F III 3 254,493 F III 4 260,488 F III 3 253,486 Cu 15 260,436 Ca V 3 253,466 Cu 15 260,375 F III 3 253,486 O III 0 260,375 F III 3 253,486 O II 0 260,375 F III 1 1 254,493 Cu 15 260,375 F III 1 1 254,494 Cu 15 260,259,978 Cu 254,494 O IV 6 259,978 Cu 255,494 O IV 6 259,978 Cu 20 251,495 Cu 1 1 258,866 Cu 20 20 251,495 Cu 1 1 258,871 Cu 255 256,494 O IV 6 259,978 Cu 20 251,495 Cu 1 1 258,871 Cu 255 256,494 O IV 6 259,978 Cu 20 251,495 Cu 1 1 258,871 Cu 20 255,494 Cu 1 1 258,871 Cu 20 20 254,494 Cu 1 1 258,873 K VI 3 2 254,494 Cu 1 1 258,873 K VI 3 2 254,494 Cu 1 1 258,875 Cu 20 20 20 20 20 20 20	λ	Symbol	I	λ	Symbol	I
259,609 K VI 2 251,947 Cu 20 259,576 Ca V 3 251,816 Ca VI 1 259,558 Cu 20 251,726 Ne III 2 259,542 C IV 7 251,670 Cu 20 259,471 C IV 6 251,558 Ne III 2 259,199 Cu 20 251,465 Ca VI 4 258,927 Cu 80 251,371 Na III 6 258,873 K VI 3 251,354 Ca IV 3 258,411 K VI 1 251,278 Cu 20 258,265 Cu 45 258,251 Ca V 3 251,148 O IV 1 258,265 Cu 45 258,267 O IV 3 251,148 O IV 1 258,004 Cu 15 258,004 Cu 15 257,976 Ca V 5 250,940 Ar VII 7 258,004 Cu 20 257,657 K VI 2 250,265 Ca VI 4 257,626 Cu 20 250,400 Cu 30 257,657 K VI 2 250,265 Ca VI 4 257,626 Cu 20 249,914 Ca VI 3 256,898 Cu 40 256,890 F III 2 249,886 Ar VII 5 256,890 F III 1 2 249,886 Ar VII 2 256,891 K VI 3 249,408 Ca IV 3 256,673 F III 1 249,384 Ar VII 2 256,425 O III 3 249,385 O IV 4 256,425 O III 2 249,385 O IV 4 256,425 O III 2 249,385 O IV 3 256,425 O III 2 249,228 F IV 1 256,425 O III 2 249,228 F IV 1 256,425 O III 2 249,228 O IV 3 256,425 O III 2 249,228 F IV 1 256,425 O III 2 249,228 O IV 3 256,425 O III 2 249,228 O IV 3 256,425 O III 2 249,228 O IV 3 256,425 O III 2 249,213 Cu 20 256,365 Cu 30 249,125 Si VI 8	262,882 262,729 262,627 262,553 262,442 262,289 262,113 261,806 261,751 261,716 261,606 261,200 261,028 261,027 260,967 260,782 260,556 260,498 260,455 260,446 260,389 260,375 260,332 260,313 260,253 260,245 259,978 259,871	O III O III C IV C IV Cu O III O III Cu F III F III Cu K II O IV F III N IV Ca V O IV F III Ar VIII F III Cu Ca Ca V	1 0 4 3 20 0 2 20 6 7 30 1 1 4 25 1 9 3 2 3 10 3 6 4 4 4 25 3 25 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	256,317 255,865 255,772 255,725 255,624 255,417 255,302 255,252 255,214 255,158 255,044 254,772 254,595 254,510 254,491 254,193 254,162 253,786 253,465 253,465 253,083 254,965 252,965 252,965 252,988 252,780 252,564	He I F III F III F III F III Cu O III O IV Cu O III Cu F IV Cu F IV F III F III Cu O III Cu O III Cu O IV K VI Cu O IV K VI O IV Cu O IV	150 7 6 5 1 35 0 5 45 1 0 70 1 50 2 3 4 15 0 15 15 15 15 16 17 16 17 17 18 18 18 18 18 18 18 18 18 18
",	259,856 259,609 259,576 259,558 259,542 259,471 259,199 258,927 258,873 258,411 258,265 258,251 258,207 258,116 258,018 258,018 258,004 257,657 257,657 257,657 257,657 257,657 257,657 257,657 256,898 256,890 256,890 256,890 256,425 256,460	Ca V K VI Ca V Cu C IV Cu K VI K VI Cu Ca V O IV K VI Cu Ca V K VI Cu Ca V K VI Cu Cu Cu Cu Cu Cu Cu Cu Cu Ci Cu Ci Cu Ci Cu Ci	3 2 3 20 7 6 20 80 3 1 45 3 2 4 15 5 2 20 40 2 2 3 1 1 3 3 2 4 3 3 2 4 3 2 3 3 4 3 3 3 3 3 3 3	251,947 251,816 251,726 251,670 251,558 251,465 251,371 251,354 251,278 251,148 251,145 251,145 251,114 251,026 250,940 250,515 250,400 250,265 250,153 249,914 249,886 249,415 249,408 249,408 249,365 249,228 249,223 249,213 249,125	Cu Ca VI Ne III Cu Ne III Ca VI Na III Ca IV Cu O IV Ne III O IV F IV Ar VII Ca IV Ca VI Ca IV Ca IV Ca IV Ca IV Co IV I V I V I V I V I V I V I V I V I V	20 1 2 20 2 4 6 3 20 1 2 1 10 7 8 30 4 3 3 3 5 15 3 2 4 4 1 3 2 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

λ	Symbol	I	λ	Symbol	I
248,668 248,636 248,618 248,574 248,538 248,459	C V Ca III O III O III O III O V	0 4 2 1 1	241 ,815 241 ,583 241 ,037 240 ,979 240 ,758 240 ,730	O III Cu O III O III K III F III	1 15 2 2 3 2
248,426 248,320 248,004 247,807 247,777 247,742	Cu O III Ne IV Ne IV K VI Cu	50 1 8 8 1 25	240 ,721 240 ,550 240 ,371 240 ,275 240 ,233 240 ,146	Ca VI F III F IV F IV F III F IV	6 1 7 7 1 7
247,709 247,708 247,564 247,561 247,422 247,415 247,357	N V K N V K Ne IV C IV C IV	7 3 6 2 1.0 2 1	240,079 240,079 240,017 239,935 239,856 239,693 239,618	F IV O IV F IV O IV F IV N IV N IV	9 1 7 0 7 1 4
247,205 247,202 247,080 246,563 246,503 246,465	N IV K O III O IV O IV O IV	10 2 1 4 3 2	239 ,592 239 ,535 239 ,296 239 ,210 239 ,196 239 ,161	O IV Ca VI Ca VI N IV C IV N IV	3 7 0 2 1
246,265 246,235 246,001 245,860 245,830 245,775 245,720	O III K V Si VI F III C IV C IV O IV	3 1 8 1 5 4 1	239 ,010 238 ,573 238 ,361 238 ,250 238 ,200 238 ,099 238 ,042	K III O IV O IV C IV C IV F IV F IV	2 15 14 3 2 1 2
245,002 244,907 244,768 244,698 244,049 243,922	FIII CIV FIII FIII OIII FIV ClVI	3 10 4 2 2 4 3	238 ,012 237 ,983 237 ,955 237 ,913 237 ,903	F IV N IV F IV F IV N IV	3 3 4 3 2
243,883 243,854 243,796 243,760 243,736 243,364 243,208	CI VI F IV Al VI F IV F III CI VI	12 3 12 2 1 2	237 ,860 237 ,331 237 ,231 236 ,710 236 ,435 236 ,071	N IV He II Cl V O III Cl V	1 35 2 1 1 1
243 ,194 243 ,027 242 ,883 242 ,631 242 ,592	Cl VI He II Cl VI Ca VI Ca VI	8 70 3 5 3	235 ,840 235 ,299 234 ,988 234 ,701 234 ,347 234 ,316	F V Cu O IV Ne IV He II Ne IV	$30 \\ 3 \\ 25 \\ 20 \\ 25$
242,439 242,384 242,324 242,265 242,183 242,140	F V Ca III F V Ca VI O IV	2 3 3 3 0	234 ,258 234 ,249 234 ,195 234 ,124 233 ,596 233 ,561	Mg III N IV N IV N IV O IV O IV	12 2 4 3 6 8 3
242 ,045 241 ,879	O IV	2 1	233 ,530 233 ,526	C IV F IV	3 4 86

λ 233,521 233,495 233,457 233,393 233,297 233,222 233,159 232,673 232,584 232,531	O IV O IV O IV F IV F IV F IV K V He II Ca VI O V Mg III He II	6 7 7 5 2 6 2 1 13 5	226,608 226,341 226,166 226,091 226,051 226,038 225,628 225,497 225,337	F V F V F III F III F III O III Ca VI	2 2 4 3 2 1 7
233,495 233,457 233,393 233,297 233,222 233,159 232,673 232,584	O IV O IV F IV F IV F IV K V He II Ca VI O V Mg III	7 7 5 2 6 2 1 13 5	226,341 226,166 226,091 226,051 226,038 225,628 225,497 225,337	F V F III F III F III O III Ca VI	2 4 3 2 1 7
232,282 231,823 231,730 231,454 231,302 231,240 231,200 231,144 231,100 231,070 231,031 231,015 230,875 230,686 230,682 230,593 230,495 230,495 230,43 230,117 230,040 229,896 229,868 229,736 229,736 229,736 229,736 229,437 229,431 229,437 229,431 229,261 228,988 228,898 228,898 228,898 228,628 228,628 228,628	O IV F III O IV F III O IV He II O IV Na III Ca VI C IV He II F III O IV O IV Na III F III O IV O IV Na III F III Ca VI C IV IT V O III F IV C IV III F IV O III F IV O III F IV O IV O V O V	7 14 8 7 6 6 4 6 3 7 3 2 7 2 5 1 2 5 2 4 5 0 0 3 3 7 5 2 2 0 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1	225,299 225,205 225,136 225,098 223,841 223,728 223,605 223,497 223,456 223,394 223,241 222,791 222,763 222,600 222,378 222,600 222,378 222,600 222,378 222,600 222,378 221,648 221,515 220,946 220,765 220,352 219,896 218,643 218,483 218,483 218,483 218,483 218,184 218,131 218,085 217,830 217,777 217,743 217,640 217,337 217,743 217,640 217,337 217,227 216,960 216,454 216,120	Ti V O IV N IV N IV N IV O IV O IV F IV F IV F IV C IV O IV O IV O IV O IV O IV Ar VI F IV O V Ar VI F IV Ne IV	25 100 5 5 4 3 0 25 1 2 3 25 7 4 5 40 15 3 4 0 5 7 13 3 5 20 15 10 20 15 10 20 15 10 20 15 10 10 10 10 10 10 10 10 10 10
227,549 227,510 227,468 227,374	O V O V O V O V	5 7 5 5	216,063 216,018 215,843 215,711	Cu O V Ne IV Ne IV	50 8 15 3
227 ,374 227 ,211 227 ,101 227 ,079 226 ,944	O V F IV F IV F IV F IV	5 4 5 3 6	215 ,671 215 ,611 215 ,396 215 ,340 215 ,245	Na III Cu Ne IV Na III O V	4 50 3 4 9

λ	Symbol	I	λ	Symbol	I
215,230 215,104 215,042 215,034 214,868 214,865 214,896 214,351 214,290 214,249 214,235 214,209 214,206 214,155 214,062 214,032 213,978	Na III O V Na III O V Na III F III F III Na III K V O IV O IV Cu O IV F IV O IV	4 8 2 7 4 1 1 2 2 1 1 4 4 20 6 7 5 4	206,021 206,002 205,960 205,956 205,862 205,842 205,778 205,772 205,610 205,552 205,487 205,278 205,102 204,996 204,998 204,908 204,786 204,786	N IV O IV N IV N IV N IV N IV N IV K VI O IV F V K VI Cu F V Na IV Cu O V O IV Ne IV O IV Ne IV Cu	2 1 2 4 2 0 3 2 30 4 6 60 3 0 5 0
213,848 213,121 213,061 212,974 212,578 212,556 212,421 211,808 211,707 211,396	F IV K V O IV O IV O IV Ne IV C IV O IV Cu N IV Cu	7 1 3 3 2 150 5 0 20 0 50	204,708 204,531 204,270 204,056 203,959 203,890 203,890 203,851 203,823	O IV Ne IV Ne IV Cu Na IV O V O V K III O V K III	0 25 15 15 2 6 8 3 6
211,109 210,612 210,547 210,480 210,217 209,723 209,648 209,306 209,274 209,241 208,902 208,899	Cu F IV F IV Cu Ca Cu N V N V Cu Cu Cu	15 1 1 15 3 30 1 2 30 60 80	203,821 203,783 203,432 203,324 203,282 203,152 203,057 203,050 203,048 203,010 202,891	O V O V Cu Na III Na III F IV C IV Na III O IV Cu O IV	7 6 60 2 2 2 1 2 3 5 60 4
208,734 208,549 208,502 208,485 208,254 207,925 207,794 207,733 207,348 207,282 207,239 207,183	Ne IV F IV Cu Ne IV F IV Cu O V Cu O IV Cu O IV	100 2 15 100 9 35 10 15 4 20	202,760 202,720 202,490 202,393 202,335 202,282 202,226 202,191 202,184 202,158 202,065 201,862 201,615	Na III Na III Na III O V O V O V O V Na III O V Cu Ti VI Cu	3 3 2 7 5 5 5 4 5 20 5
206,842 206,641 206,594 206,430 206,355 206,155	Cu C IV F V F V Cu Na IV	35 3 3 2 60 3	201,465 201,329 201,313 201,222 201,160 201,101	F IV Cu Ti VI F IV F IV F IV	4 15 5 6 8 6

λ	Symbol	I	λ	Symbol	I
201 ,098 201 ,073 201 ,063	O IV O IV F IV	1 1 7	194,900 194,840 194,839	Ti VI F VI Ne VI	7 1 2
201 ,022 201 ,011 200 ,995	O IV F IV O IV	0 6 2	194,796 194,623 194,593	Cl III Ne IV O V	2 50 8
200, 966 200, 915 200, 861 200, 860	O IV O IV F V Ca V	1 1 1 3	194,477 194,306 194,276 194,166	Ne IV Na III Ne IV Na III	40 1 100 0
200 ,827 200 ,68 200 ,512	O IV C IV Ca V	1 1 5	194,108 194,032 192,906	F V Na III O V	3 1 14
200 ,341 200 ,089 200 ,001 199 ,934	K VI F IV F IV F IV	1 7 5 5	192,800 192,751 192,747	O V O V Ti VI	13 12 8
199,834 199,890 199,849 199,804	Ca V F IV F IV	3 5 5	192,705 192,635 192,244 192,206	Ti VI Ar VII O IV O IV	1 7 3 5
199 ,769 199 ,761 199 ,759 199 ,607	Na IV F IV Ti VI F IV	6 5 6 1	192,169 192,139 192,041	Ö İV O IV Ar VII	4 4 5
199,553 199,282 199,086	Ca V Li II F IV	6 3 3	191, 973 191,892 191,801	F V F V Ca V	4 3 2 3
199 ,04 199 ,004 198 ,974	C IV F IV Ti VI	1 3 8	191,759 191,752 191,695	Ar VII O IV O IV O IV	$\frac{3}{2}$
198 ,476 198 ,031 197 ,82 197 ,648	F V O V C IV Ca V	$\begin{array}{c}1\\3\\1\\2\end{array}$	191 ,640 191 ,609 191 ,556 191 ,480	O IV O IV O V	0 2 2 2
197,531 197,455 197,230	Ca V Ti VI N IV	$\begin{bmatrix} 2 \\ 5 \\ 3 \end{bmatrix}$	191 ,458 191 ,439 191 ,397	O V Ca V O V	1 3 0
197, 108 197, 007 196, 978 196, 970	F IV N IV K VI Ca V	2 1 1 5	191,000 190,839 190,835	Na IV F V Na IV	6 7 8
196,968 196,954 196,870	F IV N IV F V	1 0 1	190 ,645 190 ,571 190 ,565	Ne IV F V Ne IV	15 6 25
196,713 196,438 196,435	F V F IV O IV	2 6 0	190 ,558 190 ,457 190 ,440 190 ,363	Ca V Ca V Na IV Ca V	3 5 10 4
196,390 196,351 196,348	F IV F IV O IV	5 4 0	190 ,250 190 ,158 190 ,126	N V N V Na IV	$\begin{array}{c} 32 \\ 20 \\ 6 \end{array}$
196,009 195,863 195,621 195,553	O IV O IV Ne V Ne V	8 7 2 3	189,943 189,346 188,870	F V Na III Na III	2 1 2
195 ,538 195 ,368 195 ,227	Na III Ne V Cl III	0 5 3	188 ,758 188 ,656 188 ,526 188 ,424	F IV F IV Mg III Ne VI	1 2 3 3
194,936	Ne VI	2	188,190	O IV	0

188,452 O IV 2 182,205 O V 2 287,916 F IV 1 182,148 Ti V 1 5 187,916 F IV 1 182,148 Ti V 1 187,404 Mg III 8 482,128 Na IV 6 6 187,405 F IV 2 181,876 O IV 4 181,738 Na IV 8 185,382 O IV 0 181,746 N IV 1 186,382 O IV 0 181,746 N IV 1 186,386 F V 4 181,691 No IV 20 186,330 O IV 2 181,695 F IV 2 181,695 F IV 2 186,879 F V 3 181,521 F IV 4 186,872 O IV 1 181,521 F IV 4 186,872 O IV 1 181,521 F IV 4 186,872 O IV 1 181,521 F IV 4 186,873 No IV 5 181,435 Mg IV 5 181,695 F IV 2 181,695 F IV 2 181,695 F IV 4 186,875 No IV 1 181,521 F IV 4 186,576 No IV 5 181,265 No IV 5 181,265 No IV 5 181,275 No IV 5 181,275 No IV 5 181,275 No IV 1 188,510 No IV 1 188,5479 No IV 2 189,074 Ar VIII 1 1 1 1 1 1 1 1 1						
187,946 F IV 4 182,148 Ti VI 5 187,240 F IV 3 182,148 Na IV 6 187,105 F IV 2 181,955 O IV 4 181,705 F IV 2 181,876 O IV 4 181,895 O IV 5 181,895 O IV 5 181,895 O IV 5 181,895 O IV 6 180,968 F V 4 181,995 O IV 1 1 181,691 Ne IV 20 186,968 F V 4 181,691 Ne IV 20 186,965 F IV 2 181,695 F IV 3 181,591 F IV 4 181,695 F IV 4 181,695 F IV 4 181,695 F IV 5	λ	Symbol	I	λ	Symbol	I
187,946 F IV 4 182,148 Ti VI 5 187,240 F IV 3 182,148 Na IV 6 187,105 F IV 2 181,955 O IV 4 181,705 F IV 2 181,876 O IV 4 181,895 O IV 5 181,895 O IV 5 181,895 O IV 5 181,895 O IV 6 180,968 F V 4 181,995 O IV 1 1 181,691 Ne IV 20 186,968 F V 4 181,691 Ne IV 20 186,965 F IV 2 181,695 F IV 3 181,591 F IV 4 181,695 F IV 4 181,695 F IV 4 181,695 F IV 5	188.152	O IV	2	182,205	o v	2
187, 194	187,916	\mathbf{F} IV	1			$\bar{5}$
187, 105			3 8			
187,008			$\frac{3}{2}$			
186,982		FV				ა 8
186,936 O IV 2 181,631 Ne IV 20 186,915 Ne IV 15 181,614 Ne IV 20 186,879 F V 3 181,571 F IV 4 186,872 O IV 1 181,571 F IV 4 186,872 O IV 1 181,571 F IV 4 186,788 F V 4 181,345 Mg IV 8 186,787 No IV 5 181,275 O IV 5 186,787 No IV 50 181,265 K VI 1 186,575 Ne IV 150 180,796 Mg IV 9 186,510 Mg III 9 180,617 Mg IV 10 186,069 N V 62 180,481 O IV 2 185,883 K VI 2 180,351 O IV 1 185,544 O IV 4 180,254 Ar VIII 15 185,484 F IV 3 179,943 F IV 2 185,485 O V 2	186,982	O IV	0			
186, 915						
186,879 F V 3						
186,872	·	$\mathbf{F} \mathbf{V}$	3			
186,787 Ne IV 5 181,275 O IV 5 186,787 Ne IV 5 181,275 O IV 5 181,275 O IV 5 181,275 O IV 5 181,275 O IV 1 181,150 O IV 4 180,796 Mg IV 9 188,558 F IV 1 1 180,719 Ar VI 3 180,613 NV 62 180,481 O IV 2 180,481 O IV 2 180,481 O IV 2 185,543 O IV 1 2 180,351 O IV 1 185,747 O V 9 180,254 Ar VIII 15 185,484 F IV 3 180,774 Ar VI 2 180,074 Ar VI 2 185,540 Ca V 2 189,074 Ar VI 2 185,545 O V 2 179,827 F IV 1 185,485 O V 2 179,827 F IV 1 185,588 Ca V 1 179,400 Ar VIII 10 185,288 Ca V 1 178,805 F IV 1 184,315 Ar VIII 5 184,315 Ar VIII 5 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,315 Ar VIII 3 178,540 F IV 3 184,280 Ca V 3 178,590 F V 4 184,315 Ar VIII 3 178,590 F V 4 183,375 Na III 0 178,670 F IV 1 183,345 Mg IV 0 178,679 O IV 0 179,400 Ar VIII 10 10 183,351 O IV 0 178,690 O IV 0 178,333 O IV 0 178,333 O IV 0 178,333 O IV 0 178,434 F IV 2 1 183,345 O IV 1 1 177,598 O IV 0 1 178,333 O IV 0 178,333 O IV 0 177,598 O IV 0 183,335 O IV 0 177,598 O IV 0 183,335 O IV 0 177,598 O IV 0 183,335 O IV 0 177,598 O IV 0 177,598 O IV 0 183,335 O IV 0 177,598 O IV 0 177,598 O IV 0 183,335 O IV 0 177,598 O	186,872	O IV	1		$\mathbf{F} \ \mathbf{IV}$	4
186,787						8
186,715						
186 575	•	FV	4			
186,510 Mg III 9 180,617 Mg IV 10 186,153 N V 62 180,481 O IV 2 186,069 N V 52 180,481 O IV 15 185,833 K VI 2 180,351 O IV 1 185,747 O V 9 180,254 Ar VIII 15 185,540 Ca V 2 180,074 Ar VI 2 185,540 Ca V 2 180,074 Ar VII 15 185,449 Ne IV 20 179,827 F IV 1 185,455 O V 2 179,827 F IV 1 185,455 O V 2 179,827 F IV 1 185,455 O V 2 179,827 F IV 1 185,488 Ca V 1 178,805 F IV 1 185,102 Ca V 2 178,724 F IV 1 185,410 Ca V 1 178,612 F V 3 184,315 Ar VIII 5 178,612 F V 3 184,280 Ca V 3 178,540 F IV 1 184,218 Na III O 178,434 F V 5 184,117 O VI 9 178,434 F V 5 184,117 O VI 9 178,434 F V 5 183,937 O VI 8 177,961 O IV 2 183,349 Mg IV 4 177,698 O IV 2 183,349 Mg IV 4 177,698 O IV 0 183,439 O IV 1 176,566 Ar VIII 10 183,335 O IV 1 176,566 Ar VIII 10 183,335 O IV 0 174,808 F V 4 183,319 O IV 0 174,400 F V 3 182,282 Na IV 4 174,558 F V 3 182,282 Na IV 4 174,400 F V 3 182,280 Na IV 3 174,400 F V 3 182,280 Na IV 3 174,400 F V 3 182,280	575, 186	Ne IV	150			9
186,153 N V 62 180,481 O IV 2 186,069 N V 52 180,402 Ne IV 15 185,883 K VI 2 180,402 Ne IV 15 185,747 O V 9 180,351 O IV 1 185,544 O IV 1 180,072 Ar VIII 15 185,484 F IV 3 173,943 F IV 2 185,479 Ne IV 20 179,827 F IV 1 185,384 O IV 0 178,805 F IV 1 185,384 O IV 0 178,805 F IV 1 185,102 Ca V 2 178,724 F IV 1 185,102 Ca V 1 178,805 F IV 1 184,415 Ca V 1 178,670 F IV 1 184,435 Ar VIII 5 178,670 F IV 3 184,280 Ca V 1 178,640 F IV 4 184,218 Na IIII 3	186 ,558					
186,069 N V 52 180,402 Ne IV 15 185,883 K VI 2 180,402 Ne IV 15 185,883 K VI 2 180,351 O IV 1 185,544 O IV 1 180,074 Ar VII 2 185,540 Ca V 2 180,070 Mg IV 8 185,484 F IV 3 179,943 F IV 2 185,455 O V 2 179,827 F IV 1 185,455 O V 2 179,827 F IV 1 185,288 Ca V 1 178,805 F IV 1 185,102 Ca V 2 178,724 F IV 1 185,102 Ca V 2 178,724 F IV 1 184,730 Ne V 10 178,670 F IV 3 184,415 Ca V 1 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,273 Ar VIII 5 178,642 F V 3 184,280 Mg IV 0 178,670 F IV 1 184,117 O VI 9 178,670 F IV 1 184,117 O VI 9 178,045 F IV 1 184,117 O VI 9 178,045 F IV 1 184,117 O VI 9 178,045 F IV 1 183,937 O VI 8 177,761 O IV 2 183,945 Mg IV 1 177,761 O IV 2 183,395 O IV 1 177,598 O IV 0 183,353 O IV 0 176,367 F IV 4 183,357 Ne IV 15 177,666 Ar VII 10 183,357 Ne IV 15 177,659 O IV 0 183,353 O IV 0 177,598 O IV 0 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 177,659 O IV 0 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 15 176,566 Ar VII 10 183,357 Ne IV 15 176,6007 Ne IV 50 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 15 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 15 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 177,588 O IV 0 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 15 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 176,000 Ne IV 8 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 15 176,568 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 177,588 O V 2 183,365 Ne IV 15 174,920 Ne IV 8 183,365 Ne IV 15 174,920 Ne IV 8 183,362 O IV 4 174,558 F V 3 182,282 Na IV 4 174,490 F V 3 182,282 Na IV 4 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,282 Na IV 4 174,220 O IV 3						
185,883 K VI 2 180,351 O IV 1 185,747 O V 9 180,0754 Ar VIII 15 185,544 O IV 1 180,070 Mg IV 8 185,484 F IV 3 179,943 F IV 2 185,479 Ne IV 20 179,827 F IV 1 185,384 O IV 0 179,940 Ar VIII 10 185,384 O IV 0 179,400 Ar VIIII 10 185,384 O IV 0 178,600 F IV 1 185,384 O IV 0 178,600 F IV 1 185,384 O IV 0 178,600 Ar VIIII 10 185,102 Ca V 2 178,724 F IV 1 184,730 Ne V 10 178,670 F IV 1 184,415 Ca V 3 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,218 Na IIII 0<		ΝV	52			15
185,544 O IV 1 180,074 Ar VII 12 185,540 Ca V 2 180,074 Ar VII 2 185,484 F IV 3 179,943 F IV 2 185,479 Ne IV 20 179,927 F IV 1 185,455 O V 2 179,943 F IV 1 185,384 O IV 0 179,400 Ar VIII 10 185,288 Ca V 1 178,805 F IV 1 185,102 Ca V 2 178,713 O V 2 184,730 Ne V 10 178,713 O V 2 184,415 Ca V 1 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,281 Na III 3 178,540 F IV 1 184,189 Mg IV 0 178,434 F V 5 184,199 Mg IV 1 177,971 F IV 1 184,104 Ti VI 4 <	185,883	K VI	2			
185,540				180,254	Ar VIII	15
485,484 F IV 3 180,070 Mg IV 2 185,479 Ne IV 20 179,827 F IV 1 185,455 O V 2 179,827 F IV 1 185,384 O IV 0 179,400 Ar VIII 10 185,384 O IV 0 179,400 Ar VIII 10 185,382 Ca V 1 178,805 F IV 1 185,302 Ca V 1 178,724 F IV 1 185,102 Ca V 10 178,713 O V 2 184,730 Ne V 10 178,670 F IV 1 184,415 Ca V 1 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,273 Ar VIII 3 178,540 F IV 1 184,218 Na III 0 178,126 F IV 1 184,117 O VI 9 178,015 Li II 1 184,104 Ti VI 4			$\overset{\cdot}{2}$	180,074		$\frac{2}{2}$
185,479 Ne IV 20 179,827 F IV 1 185,455 O V 2 179,400 Ar VIII 10 185,384 O IV 0 179,400 Ar VIII 10 185,288 Ca V 1 178,805 F IV 1 185,102 Ca V 2 178,724 F IV 1 184,730 Ne V 10 178,724 F IV 1 184,730 Ne V 10 178,670 F IV 3 184,415 Ca V 1 178,670 F IV 3 184,315 Ar VIII 5 178,612 F V 3 184,280 Ca V 3 178,590 F V 4 184,218 Na III 0 178,126 F IV 1 184,4189 Mg IV 0 178,126 F IV 1 184,117 OVI 9 178,015 Li II 1 183,937 OVI 8 177,808 O IV 2 183,375 Na III 0		F IV	3			8 2
185,384 O IV 0 179,400 Ar VIII 10 185,288 Ca V 1 178,805 F IV 1 185,102 Ca V 2 178,724 F IV 1 184,730 Ne V 10 178,733 O V 2 184,415 Ca V 1 178,670 F IV 3 184,315 Ar VIII 5 178,670 F IV 3 184,280 Ca V 3 178,590 F V 4 184,281 Na III 0 178,540 F IV 1 184,218 Na III 0 178,434 F V 5 184,189 Mg IV 0 178,434 F V 5 184,117 O VI 9 178,434 F V 5 183,937 O VI 8 177,808 O IV 2 183,945 Mg IV 1 177,698 O IV 1 183,454 O IV 1 177,659 O IV 0 183,459 O IV 1	185,479		20			<u>1</u>
185,288				179,400	Ar VIII	10
185,102 Ca V 2 184,730 Ne V 10 184,415 Ca V 1 184,315 Ar VIII 5 184,280 Ca V 3 184,280 F V 4 184,273 Ar VIII 3 184,218 Na III 0 184,117 O VI 9 184,117 O VI 9 184,117 O VI 8 183,937 O VI 8 177,971 F IV 2 183,915 Mg IV 1 183,747 Na III 0 183,575 Na III 0 183,454 O IV 1 183,439 Mg IV 4 183,353 O IV 0 183,353 O IV 0 183,353 O IV 0 183,353 O IV 1 183,165 Ne IV 15 183,139 O IV 0 174,880 Ne IV 10 183,016 F V 3 182,973 Mg III 2 182,832 O IV 4 174,558 F V 3 182,973 Mg III 2 182,832 O IV 4 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3				178,805	$\mathbf{F} \ \mathbf{IV}$	1
184,730 Ne V 10 178,670 F IV 3 184,415 Ca V 1 178,670 F IV 3 184,315 Ar VIII 5 178,590 F V 4 184,280 Ca V 3 178,590 F V 4 184,281 Na III 0 178,540 F IV 1 184,218 Na III 0 178,434 F V 5 184,189 Mg IV 0 178,434 F V 5 184,189 Mg IV 0 178,434 F V 5 184,189 Mg IV 0 178,015 Li II 1 184,199 Mg IV 4 177,971 F IV 2 183,937 O VI 8 177,808 O IV 2 183,915 Mg IV 1 177,698 O IV 1 183,747 Na III 0 177,698 O IV 0 183,439 Mg IV 4 177,161 Ne IV 80 183,353 O IV 0	185,102	Ca V	2			
184,315 Ar VIII 5 178,612 F V 3 184,280 Ca V 3 178,590 F V 4 184,273 Ar VIII 3 178,540 F IV 1 184,218 Na III 0 178,434 F V 5 184,189 Mg IV 0 178,434 F V 5 184,117 O VI 9 178,015 Li II 1 184,117 O VI 4 177,971 F IV 2 183,937 O VI 8 177,808 O IV 2 183,915 Mg IV 1 177,761 O IV 2 183,747 Na III 0 177,698 O IV 0 183,439 Mg IV 4 177,161 Ne IV 0 183,353 O IV 0 176,367 F IV 4 183,373 O IV 0 176,367 F IV 4 183,395 O IV 1 176,367 F IV 4 183,353 O IV 0 <t< td=""><td>184,730</td><td></td><td></td><td></td><td></td><td>$\overline{3}$</td></t<>	184,730					$\overline{3}$
184,280 Ca V 3 178,590 F V 4 184,273 Ar VIII 3 178,540 F IV 1 184,218 Na III 0 178,434 F V 5 184,189 Mg IV 0 178,126 F IV 1 184,117 O VI 9 178,015 Li II 1 184,104 Ti VI 4 177,7971 F IV 2 183,937 O VI 8 177,808 O IV 2 183,915 Mg IV 1 177,698 O IV 1 183,747 Na III 0 177,698 O IV 0 183,439 Mg IV 4 177,161 Ne IV 0 183,395 O IV 1 176,566 Ar VII 10 183,3247 Ne IV 12 176,007 Ne IV 8 183,139 O IV 0 174,880 Ne IV 50 183,439 Mg III 2 174,558 F V 4 183,247 Ne IV 10<				178 612	FV	3
184,218 Na III 0 178,434 FV 5 184,189 Mg IV 0 178,126 F IV 1 1 184,117 O VI 9 178,015 Li II 1 1 1 184,104 Ti VI 4 177,971 F IV 2 183,937 O VI 8 177,808 O IV 2 183,747 Na III 0 177,698 O IV 1 183,575 Na III 0 177,698 O IV 1 183,439 Mg IV 1 177,598 O IV 0 177,598 O IV 0 177,598 O IV 0 183,439 Mg IV 4 177,161 Ne IV 80 183,395 O IV 1 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 183,165 Ne IV 15 174,920 Ne IV 10 183,016 F V 3 182,979 F V 4 174,698 F V 4 174,698 F V 4 182,979 F V 4 174,698 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 O V 2 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,280 Na IV 4 174,220 O IV 3			3		$\mathbf{F} \mathbf{V}$	4
184,216 Na III 0 478,126 F IV 1 184,189 Mg IV 0 478,126 F IV 1 184,117 O VI 9 478,015 Li II 1 184,104 Ti VI 4 477,974 F IV 2 183,937 O VI 8 477,808 O IV 2 183,915 Mg IV 1 477,761 O IV 2 183,747 Na III 0 477,698 O IV 1 183,454 O IV 1 477,659 O IV 0 183,439 Mg IV 4 477,559 O IV 0 183,353 O IV 0 476,566 Ar VII 10 183,353 O IV 0 476,367 F IV 4 183,439 Ne IV 12 476,007 Ne IV 50 183,139 O IV 0 474,920 Ne IV 8 183,439 F V 3 474,698 F V 4 183,016 F V 3					FIV	
184,117 OVI 9 184,117 OVI 4 184,104 Ti VI 4 183,937 OVI 8 183,945 Mg IV 1 183,747 Na III 0 183,575 Na III 0 183,454 O IV 1 183,353 O IV 0 183,395 O IV 1 183,353 O IV 0 183,439 Mg IV 4 183,247 Ne IV 12 183,165 Ne IV 15 184,177,161 Ne IV 80 184,177,161 Ne IV 80 177,598 O IV 0 177,699						
184,104 Ti VI 4 177,971 F IV 2 183,937 O VI 8 177,971 F IV 2 183,915 Mg IV 1 177,761 O IV 2 183,747 Na III 0 177,698 O IV 1 183,575 Na III 0 177,698 O IV 0 183,439 Mg IV 4 177,161 Ne IV 80 183,395 O IV 1 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 176,007 Ne IV 8 183,439 O IV 0 174,920 Ne IV 8 183,165 Ne IV 15 174,920 Ne IV 8 183,016 F V 3 174,880 Ne IV 10 183,973 Mg III 2 174,558 F V 3 182,973 Mg III 2 174,558 O V 2 182,711 O IV 3 <td></td> <td>O VI</td> <td></td> <td>{[</td> <td>1;11</td> <td>1</td>		O VI		{ [1;11	1
183,915 Mg IV 1 177,761 O IV 2 183,747 Na III 0 177,698 O IV 1 183,454 O IV 1 177,659 O IV 0 183,439 Mg IV 4 177,598 O IV 0 183,395 O IV 1 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 176,007 Ne IV 50 183,165 Ne IV 15 174,920 Ne IV 8 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 O V 2 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3		Ti VI	4			$\overset{,}{2}$
183,747 Na III 0 177,698 O IV 1 183,454 O IV 1 177,659 O IV 0 177,598 O IV 1 1 10 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 183,165 Ne IV 15 176,007 Ne IV 183,016 F V 3 174,920 Ne IV 10 183,016 F V 3 174,880 Ne IV 10 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 F V 3 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3 174,220 O IV 3 182,240 Mg III 3 174,220 O IV 3				177,808		$\frac{2}{2}$
183 ,575		Mg IV Na III				
183,454		Na III	0			0
183,439 Mg IV 4 177,161 Ne IV 80 183,395 O IV 1 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 176,007 Ne IV 50 183,165 Ne IV 15 174,920 Ne IV 8 183,139 O IV 0 174,880 Ne IV 10 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 F V 3 182,731 O IV 3 174,558 F V 3 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3	183,454	O IV	1			
183,395 O IV 1 176,566 Ar VII 10 183,353 O IV 0 176,367 F IV 4 183,247 Ne IV 12 176,367 F IV 4 183,465 Ne IV 15 176,007 Ne IV 50 183,139 O IV 0 174,920 Ne IV 8 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 O V 2 182,832 O IV 4 174,558 F V 3 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3	183,439			177,161	Ne IV	
183,247 Ne IV 12 183,165 Ne IV 15 183,139 O IV 0 174,920 Ne IV 8 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 F V 3 182,832 O IV 4 174,513 F V 3 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3						
183,165 Ne IV 15 176,007 Ne IV 30 174,920 Ne IV 8 183,139 O IV 0 174,880 Ne IV 10 174,698 F V 4 174,558 F V 3 182,973 Mg III 2 182,832 O IV 4 174,558 O V 2 174,513 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3				11		
183,139 O IV 0 174,880 Ne IV 10 183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 O V 2 182,832 O IV 4 174,558 O V 2 182,711 O IV 3 174,513 F V 3 182,722 Na IV 4 174,303 Ne IV 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3					Ne IV Ne IV	
183,016 F V 3 174,698 F V 4 182,979 F V 4 174,558 F V 3 182,973 Mg III 2 174,558 G V 2 182,832 O IV 4 174,558 G V 2 182,711 O IV 3 174,513 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3	183 .139	O IV		174,880	Ne~IV	10
182,973 Mg III 2 182,832 O IV 4 174,558 O V 2 182,711 O IV 3 174,513 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3	183,016	$\mathbf{F} \mathbf{V}$	3	174 ,698		
182,832 O IV 4 174,558 O V 2 182,711 O IV 3 174,490 F V 3 182,282 Na IV 4 174,303 Ne IV 3 182,240 Mg III 3 174,220 O IV 3			$\frac{4}{2}$	1		
182,240 Mg III 3 174,220 O IV 3		ÖÏV				2 3
182,240 Mg III 3 174,220 O IV 3			3			3
$_{182},_{240}$ Mg III 3 174,220 O IV 3	182,282	Na IV	4	174,303	Ne IV	3
		Mg III	3	∥ 174 ,220	OIV	ა 87

λ	Symbol	I	λ	Symbol	I
174,105 174,008 173,968 173,932 173,917 173,851 173,803	O IV Na IV O IV Ne V O IV O IV O IV	2 0 0 50 2 1	168,042 167,991 167,921 167,921 167,858 167,837 167,670	O V O V Ne IV Ne V F V Ne V Ne V	4 8 5 5 1 5 25
173 ,145 173 ,082 173 ,020 172 ,935 172 ,620 172 ,525	F VI O VI F V O VI Ne IV Ne IV	1 13 1 12 80 50	167,610 167,510 167,483 167,145 166,947	Ne V Na V Ne V O IV N V N V	3 1 15 0 52 44
172,492 172,306 172,163 174,896 171,653 171,582	Ne IV Mg IV O V Mg III Mg IV Li II	40 7 12 0 8 1	166,499 166,444 166,246 166,234 166,177	F IV F IV K IV O V F V	2 2 1 5
171,395 171,302 171,241 171,212 171,191 171,121	Mg III F V F V Ne VI O IV O IV	4 2 1 2 0 2	166 ,163 166 ,152 166 ,113 165 ,983 165 ,195 164 ,986	K IV O V O V F V Mg III O V	0 4 3 9 0 2
171,114 171,076 171,071 171,066 170,988	Ne VI Na V O IV F IV O IV	5 1 2 3 0	164,954 164,841 164,710 164,656 164,628 164,612	Mg III Na IV O V O V O V F IV	2 4 4 6 4
170,940 170,923 170,802 170,631 170,227	O IV Na V Mg III Na V K IV	0 1 5 1 1	164,578 164,450 164,384 164,294 164,178	O V Ti V Mg III Ne V O V	2 5 6 2 8 2
170,187 169,839 169,790 169,748 169,746 169,661	FIV FIV FIV MgIII FIV	5 2 3 3 2 1 2	164,159 164,145 164,023 164,015 163,930 163,840	Mg III Ne V Ne V F VI Na V Na IV	0 10 10 1 2 4
169,610 169,586 169,502 169,481 169,478 169,166	FIV OV FIV OV FIV	1 0 2 1 0 2	163,616 163,602 163,596 163,586 163,562 163,558	Na V Ne IV F V Mg III Ne IV F V	3 2 2 0 12 5
169,150 168,741 168,590 168,544 168,517 168,450	Mg III Li II N V Na IV N V F IV	1 12 5 5 2	163,501 163,456 163,187 163,140 163,138	F V F V Na IV Ti V F VI	4 3 6 5 2
168 ,409 168 ,101 168 ,084 168 ,077	Na IV Ne IV Na IV O V	$\begin{bmatrix}2\\10\\4\end{bmatrix}$	162,565 162,494 162,445 162,270 162,215	N V O V Na IV F V F V	48 4 8 4 3

			Is.		
λ	Symbol	I	λ	Symbol	I
162,172	F V	3	156,247	F VI	6
162,121 162,082	$f F \ V \ f F \ V$	$\frac{2}{3}$	156,225	0 V	3
162,053	FV	$\frac{3}{2}$	156 ,158 156 ,126	O V O V	$rac{2}{1}$
162,013 161,686	F V Al IV		155,832 155,781	Na IV Na IV	0 1
161,683	Mg III	14 0	155,761	Na IV Na IV	$\overset{1}{2}$
161 ,477 161 ,414	F VI F VI	1	155,622	Na IV	0
161,414	F VI	1 1	155 ,515 155 ,445	Na IV Na IV	$\frac{4}{3}$
161,308	F VI	3	155,354	Na IV	0
161 ,257 161 ,174	F VI F VI	1 1	155,248	Na IV	2
161,135	Mg~III	0	155,090 154,506	Na IV F VI	1 3
160,804	$\mathbf{M}\mathbf{\tilde{g}}$ IV	4	154,488	Ne IV	3 5
160 ,471 160 ,230	Ne IV Mg IV	$ \begin{array}{c} 10 \\ 6 \end{array} $	153,948 153,880	O V F VI	$\frac{3}{4}$
160,141	O IV	0	153,741	F VI	
160,073 159,755	Al IV Mg III	16 0	153,683	ΝV	3 6
159,380	O V	4	153,678 153,624	F VI N V	$\frac{2}{3}$
159,343	o v	4	153,192	N V	28
209, 259 159, 175	Mg III Ar VIII	0 5	153,162	O IV	0
158,933	N V	7	153,136 152,591	N V Mg V	18 0
158 ,926	O V F IV	$\frac{2}{1}$	152,563	ΓV	<u>2</u> 1
158, 925 158, 923	Ar VIII	8	152,527	Mg V	
158,867 158,822	N V Ne IV	4 15	152,511 152,391	F V F V	$\frac{4}{3}$
158 ,813	o v	1	152,384	Mg V	1
158,646	Ne IV	15	152 ,355 152 ,339	O IV F V	$rac{0}{2}$
158 ,606 158 ,601	O IV F IV	1	152,264	o iv	0
158,553	O IV	0	152,259	Ar VII	3
158,537	F V	4 0	152 ,231 152 ,149	$egin{array}{l} ext{Ne IV} \ ext{Mg V} \end{array}$	15 3
158,530 158,105	Mg III Ne IV	2	152,019	$\mathbf{M}\mathbf{g}^{\mathbf{V}}$	0
158,090	N V Ne IV	$\frac{36}{5}$	151 ,876	Ar VII	2
158 ,063 158 ,030	N V	24	151,817 151,698	Ne IV Ar VII	15 1
157,862	Ne IV	2 3	151,548	o v	$rac{6}{5}$
157 ,782 157 ,781	Na IV Ne IV	3 3	151,481	o v	
157,626	Ne IV	5	151 ,449 151 ,424	O V Ne V	$egin{array}{c} 4 \\ 12 \end{array}$
157,599	Na IV	1	151,303	Na V	1
157 ,515 157 ,511	F V Na V	$\frac{1}{2}$	151,303 151,188	Na IV Na V	1 1
157 ,433	K VI	2 1	151,127	Na V	4
157 ,209	Na V	3	151,048	Na IV	0
157 ,090 157 ,036	Na IV Na V	$\frac{4}{2}$	151,005 150,977	F IV F IV	1 1
156,887	Na IV	2 3 3 5	150,968	Na V	2
156 ,873 156 ,780	Ne IV Na IV	3 5	150,968	Na IV	2
	Ne V	$\frac{\circ}{2}$	150 ,931 150 ,695	Ne IV Na IV	$rac{1}{2}$
156 ,610 156 ,536	Na IV	8	150,647	Na IV	$egin{array}{c} 2 \ 2 \ 3 \end{array}$
156,480	Ne IV	5	; 150,545	Na IV	ა 81
					0

λ	Symbol	I	λ	Symbol	I
150,488 150,429 150,297 150,171 150,124 150,116 150,088 149,621 149,589 149,442 149,333 149,078 149,001 148,942 148,856 148,787 148,787 148,787 148,725 148,660 148,653 148,642 148,387 148,328 148,168 148,116 148,116 148,108 148,108 148,002 147,946 147,897 147,887 147,746 147,632 147,535	N V N V N V N V N V O VI N V O VI N V O VI N V N V N V N V N V N V N V N V N V N V	5 2 4 14 9 7 10 0 2 0 3 2 0 2 4 3 3 3 3 2 1 4 4 4 4 1 7 7 2 4 1 5 4 4 1 5 4 2 2 3 3 4 3 4 3 3 3 3 4 3 4 3 4 3 4 3	146,297 146,262 146,083 146,060 145,846 145,742 145,691 145,691 145,585 145,547 145,489 145,485 145,462 145,392 145,177 144,979 144,978 144,837 144,837 144,661 144,637 144,546 144,392 144,330 144,288 144,151 144,019 143,914 143,897 143,520 143,344 143,273	Na IV Ne IV Mg V Na IV Na IV NV F VI F VI F VI F VI F V Na IV N V O V O V F V Na V F V Na V F V Na V F V Na V Ne IV Ne IV N V Ne IV N V Ne V	1 2 6 3 0 5 3 1 1 3 1 5 1 0 4 1 1 1 1 1 1 1 1 2 3 2 1 2 2 1 1 1 5 10
147,535 147,433 147,405 147,321 147,261 147,252 147,052 147,006 146,949 146,921 146,836 146,767 146,718 146,716 146,676 146,676 146,676 146,676 146,676	Mg IV N V Mg IV O V Mg IV Ne V Mg IV Mg IV Mg IV N V Mg IV N V F VI N V F VI Mg V F VI F VI Mg IV Mg IV O V	5 24 5 4 3 3 15 4 4 4 3 3 6 2 3 4 4 5 0 0 1	143,241 143,219 142,981 142,933 142,929 142,797 142,724 142,688 142,661 142,593 142,441 142,415 142,363 142,232 142,232 142,119 141,154 141,040 140,966 140,918 140,867 140,833 140,791 140,757	N V Ne V N V Mg V Ne IV Ne V Na IV Ne V Na V Na V Na IV Na IV Na IV Na V Na IV O V F VI Na VI Mg IV Mg IV Na VI Ne V Ne V	1 5 0 6 3 0 15 0 4 10 10 0 1 2 2 0 2 0 4 2 15 15 15 15 15 15 15 15 15 15 15 15 15

λ	Symbol	I	λ	Symbol	I
716, 140	Ne V	5	135 ,953	Mg V	1
140,564	Mg IV	$\overset{\circ}{2}$	135,854	Na V	3
140,523	$\widetilde{\mathrm{Mg}}$ IV	$\overline{2}$	135,791	Na V	$\ddot{3}$
140,475	Mg IV	2	135,638	Mg V	9
425, 425	Mg IV	2	135,523	O V	$\frac{2}{5}$
414, 140	$\mathbf{F} \mathbf{V}$	1	135,397	FVI	$\ddot{3}$
140,364	ΝV	$1\overline{6}$	135,02	Li III	_
140,258	Na V	0	134,539	$\mathbf{F} \mathbf{V}$	5
140,176	Mg IV	4	134,532	Na VI	3
140,171	Na V	0	134,407	FV	$\overset{\circ}{4}$
140,127	Ne IV	3	134,272	Na V	2
140,120	Mg IV	4	134 ,183	Na V	0
140,109	ΟV	0	134 ,135	Na VI	0
140,045	O V	0	134 ,021	Na VI	1
139 ,995	Mg IV	1	133 ,994	ΝV	7
139,900	F VI	7	133,825	Na VI	2
139,869	Na IV	0	133,662	FV	1
139,800	F VI	6	133,521	o v	3
139,758 139,492	F VI O V	$\frac{5}{0}$	133 ,395	o v	0
•			133 ,388	Na V	4
139,025	O V	5	133,328	OV	$_{2}^{0}$
138,917	Na V	ა ე	133,242 133,208	Al V F V	1
138 ,812 138 ,693	Na V Mg IV	$\begin{array}{c} 3 \\ 2 \\ 2 \end{array}$	155,206	I V	
138,693	Na VI	$\frac{2}{2}$	133,202	Mg IV	3 5
			133,162	Na V	5,
138,630 138,628	Ne VI Na	3 2 5	133,013	AlV	4
138,440	Ar VIII	5	132,885	0 V 0 V	$egin{matrix} 0 \ 2 \end{matrix}$
138,397	Ne VI	3	132 ,851	O V	
138,394	Mg~IV	2	132,819	$\mathbf{F} \mathbf{V}_{-}$	2
138,262	Mg IV	3	132,815	MgIV	3
138,181	FV	ĭ	132,800	O V Na IV	1 0
138,108	o v	4	132 ,740 132 ,699	F V	1
138,054	o v	3			
138 ,030	o v	2	132,630	Al V	10
137,966	Mg IV	1	132,623	MgV	3 3 5
137 ,945	Na IV	0	132,511 132,485	F V Mg V	5 5
137,926	Ar VIII	3	132,484	F V	$\ddot{3}$
137 ,880	Mg V Mg VI	$\frac{6}{0}$	· ·	Na IV	0
137 ,814			132,465 132,453	F V	2
137,748	Mg V	7 0	132,383	ΝV	$\frac{2}{6}$
137 ,714 137 ,589	Na IV Na VI	0	132,312	O VI	2
137,305	Mg V	8	132,310	$\mathbf{F} \mathbf{V}$	1
137,234	Mg V	$\ddot{6}$	132,219	o vi	1
· ·	-	0	132,211	Na IV	0
137,144	Na IV	0	132 ,171	MgV	6
137,062	Na IV F V	3	131 ,807	ov	1
136 ,902 136 ,854	Na IV	1	750, 131	o v	1
136,748	Na IV	0	131,652	AlIV	3
		9	131,638	FV	$0 \\ 3$
136,668	Al V Na IV	$\frac{2}{0}$	131,635	Na V F V	0
136,645 136,550	Na IV Na IV	1	131 ,516 131 ,441	Al V	20
136,335	Na IV	Ô	1		
136,429	NV	8	131,413	Na V Na V	$\frac{2}{3}$
		9	131 ,345 131 ,254	Na v N V	5
136,215	Ne V Ma V	$\frac{2}{0}$	131,234	Al V	20
136 ,128 136 ,089	Mg V Ne VI	4	130,848	Al V	$\overline{2}0$
100,000	1.0 . 1	- '	,-		877

λ	Symbol	I	λ	Symbol	I
130,723 130,701 130,680 130,630 130,630 130,431 130,413 130,403 130,350 130,294 130,294 130,294 130,294 130,985 129,969 129,942 129,872 129,855 129,811 129,786 129,710 129,729 129,464 129,337 129,040 129,034 128,954 128,793 128,662	Na V Mg VI Na V Mg VI Na V Mg IV N V Al V Al IV Mg IV Na V O VI Mg IV Na V O VI Mg IV N V O VI Mg IV N V O VI Mg IV N V N V N V N V N V N V N V N V	1 0 2 1 1 4 20 11 3 2 2 1 2 2 3 1 6 4 3 5 2 2 2 1 2 2 3 5 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	126,065 125,899 125,830 125,811 125,600 125,600 125,525 125,461 125,459 125,459 125,428 125,383 125,286 125,216 125,216 125,216 125,216 125,178 124,990 124,870 124,850 124,759 124,649 124,538 124,538 124,538 124,474 124,414 124,400 124,387	Al V Na V Ne V Mg IV Mg VI Mg VI Mg VI Mg VI Na V Na V Na V Na V Na V Na V Mg IV Na V Mg IV Na V Mg IV Na V Mg IV Mg IV Mg IV Mg IV Mg IV Mg IV F VI Mg IV F VI	15 2 2 14 4 15 3 0 3 0 5 4 3 4 2 2 0 2 3 3 6 2 0 2 0 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
128,500 128,430 128,412 128,235 128,229 128,112 128,051 128,025 127,837 127,7 127,473 127,473 127,444 127,036 126,985 126,920 126,814 126,779 126,677 126,608 126,557 126,544 126,458 126,458 126,458 126,458 126,450 126,368 126,280 126,210 126,090	O VII N V O VII O V N V N V N A N A V	0 00 00 0 0 3 4 4 4 4 2 4 4 0 0 0 5 0 1 0 0 1 2 2 1 0 1 0 1 0 1 0 1 0 1 0 1	124,153 124,059 124,034 123,970 123,929 123,868 123,774 123,744 123,712 123,665 123,590 123,588 123,500 123,377 123,273 123,134 123,091 123,051 123,033 122,686 122,624 122,520 122,520 122,520 122,521 122,200 122,169	Na VI Na VI Al IV Na VI Na VI Na VI Na VI F V Na VI Ne V Mg IV Mg IV Mg IV Mg IV F VI Na VI F VI Na VI F VI Na VI F VI Ar VIII Ne VI Ar VIII Ne VI F	4 4 8 2 5 3 1 4 3 0 0 1 0 3 1 2 1 4 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

λ	Symbol	I	λ	Symbol	I
122 ,128 122 ,122	O V F VI	0	115,399 115,093	Mg V Mg V	4 4
122,034 122,018 121,922	Mg V Na VI Mg V	4 3 5	115,013 114,785	Mg V Mg V	$rac{6}{6}$
121,913 121,773	Na VI Na VI	3 4	114,759 114,738 114,725	Al IV Na V Mg VI	0 1 0
121,644 121,290	$egin{array}{l} \mathbf{Mg} \ \mathbf{V} \\ \mathbf{Mg} \ \mathbf{VI} \end{array}$	6 3	114,700 114,666	Na V Na VI	1 4
121 ,263 121 ,140	Na V Ne VI	0 5	114,624 114,412	Mg VI Mg VI	0 0 0
121 ,025 121 ,004 120 ,973	Mg VI Na VI Na VI	5 1 2	114 ,329 114 ,324 114 ,285	Al IV Mg V Mg V	3 3
120 ,931 120 ,331	Na VI O VII	3 00	114,226 114,199	Mg V Mg V	3 3
120 ,283 120 ,157 120 ,116	Mg IV Ar VIII F VI	1 1 1	114,059 114,029	Mg V Mg V	4 2
120,093 120,032	Ar VIII F V	$\frac{1}{2}$	113 ,990 113 ,934 113 ,93	Mg V Mg V Li III	3 3 —
119 ,986 119 ,684 119 ,447	F V Na VI Mg V	$\begin{matrix} 0 \\ 3 \\ 4 \end{matrix}$	113,870 113,840	Ne VI F VI	5 0
119,447 119,401 119,204	Mg V Mg V Na VI	4	113,823 113,756 113,703	Mg V Al VI Mg V	1 1 4
118,984 118,968	Al V Si V	$\begin{matrix} 6 \\ 20 \end{matrix}$	113,503 113,574	Al VI Na V	1 0
118,841 118,810 118,715	Ne V Mg V Ne V	1 5 5	113,518 113,437	Mg V Al VI	1 3 2
118,603 118,585	Mg IV Na VI	1 0	113 ,414 113 ,314	Mg V Al VI	1
118,500 118,500	Al V Na VI	10 0	113 ,217 113 ,189 113 ,125	Mg V Mg VI Na VI	2 5 4
118 ,083 117 ,990 117 ,876	Mg V Na V Na V	5 4 0	112,950 112,448	Na VI Na VI	$\frac{\hat{4}}{3}$
117,860 117,699	Si V Na VI	20 3	112,347 112,186	Na V Na V	0
117 ,609 117 ,527 117 ,491	Na VI Mg VI Na VI	3 1 4	112,077 112,009 112,009	Na V Na VI Na V	0 3 3
117,377 117,226	Al IV Mg VI	0 3	111 ,879 111 ,864	Na V Mg VI	$_{4}^{0}$
116,968 116,920	Mg VI Al IV	5 5 5	111,793 111,780 111,746	Na VI Al IV Mg VI	1 0 4
116 ,7 116 ,459 116 ,419	Ne VII Al IV O VI	3 7 2	111 ,740 111 ,725 111 ,590	Na VI Al IV	1 1
116,347 116,094	O VI F VI	1 0	111,552 111,552	Mg VI Na V	5 0
115,824 115,780 115,729	O VI Na VI Na VI	$\begin{array}{c} 4 \\ 0 \\ 2 \end{array}$	111 ,512 111 ,496	Na V Mg V	1 2 2
115 ,537	Mg V Ne VII	4 3	111 ,467 111 ,419 111 ,247	Mg V Mg V Mg V	$egin{array}{c} 2 \ 2 \ 2 \end{array}$
115 ,5 115 ,4	Ne VII	3	111,200	AlIV	1

	_						
	λ	Symbol	I	λ	Symbol	I	
111 111 111 111 111 111 111 111 111 11	1,199 1,199 1,160 1,142 1,091 1,031 0,939 0,921 0,878 0,859 0,817 0,809 0,750 0,410 0,220 0,148 0,121 0,085 0,029 9,974 9,896 9,843 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,812 9,763 9,816 8,975 8,8707 8,975	Mg VI Mg V Mg VI Ne VI Mg V Mg V Mg V Na V Mg V Na V Mg V Na VI No	4 4 3 1 3 3 2 0 2 4 1 2 2 2 2 0 0 0 2 1 4 5 1 2 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	107,711 107,683 107,661 107,620 107,608 107,553 107,535 107,288 107,227 107,158 107,093 107,061 107,014 106,580 106,490 106,453 106,399 106,302 106,278 106,2 106,125 106,1 106,077 106,040 105,502 105,49 105,410 105,666 104,811 104,597 104,466 104,447 104,495 104,485 104,481 104,482 104,363 104,344 104,180 104,17 104,180 104,17 104,140 104,173	Al V Na VI Mg V Al VI Na VI Mg VI Li III Mg VI Al V	6 5 2 14 3 3 4 3 1 3 3 2 0 1 2 1 1 1 7 4 7 3 3 3 1 2 1 2 1 1 1 1 2 1 2 1 2 1 2 1 2	
108 108 108	3 ,114 3 ,112 3 ,057 3 ,017	Mg VI Al V Al V Na V	2 12 12 2	104,047 103,990 103,947	Al VI Al V Mg V	20 4 3	
108 108 108 108	3,017 3,015 3,01 3,004	Na V Mg VI Li III Al V	2 3 - 5	103,947 103,940 103,904 103,881 103,805	Mg V Al VI Mg V Al V Al V	3 6 4 14 10	
107 107 107	7 ,945 7 ,934 7 ,934 7 ,820 7 ,742	Al V Na VI Na V Mg VI Na VI	20 2 2 4 2	103,482 103,40 103,333 103,210 103,163	Na V Li III Mg V Na VI Si VI	0 0 2 2	
000							

λ	Symbol	I	λ	Symbol	I
103,1 103,078 103,002 102,906 102,9 102,86 102,846 102,239 102,189 102,079 101,782 101,671 101,556 101,508 101,160 101,027 100,963 100,949 100,945 100,919 100,945 100,851 100,702 100,640 100,639 100,616 100,597 100,590 100,545 100,519 100,469 99,966 99,788 99,769 99,788 99,769 99,788 99,769 99,610 99,610 99,598 99,598 99,598 99,500 99,460	Ne VIII Na VI Na VI Na VI Na VI Mg Ne VIII Li III Si VI Mg VI Mg VI Mg VI Mg VI Mg VI Al VI Mg Na VI Al VI Mg Na VI Al VI Al VI Mg Na VI Na VI Al V Mg Na VI Na VI Al V Mg Na VI Na VI Al V Mg Si VI Al V Mg Si VI Al V Mg Si VI Al V Na VI Si VI	6 1 0 3 5 - 1 5 5 2 3 3 3 2 0 3 1 0 0 4 4 4 0 5 10 2 12 2 1 2 1 2 1 0 1 5 1 7 2 1 2 1 2 1 2 1 3 1 3 1 4 1 3 1 3 1 3 1 4 1 3 1 3 1 3	98,983 98,983 98,872 98,805 98,636 98,508 98,508 98,444 98,406 98,309 98,271 98,235 98,209 98,2 98,1 97,686 97,636 97,636 97,666 97,563 97,55 97,439 97,391 97,278 97,251 97,278 97,251 97,278 97,251 97,439 96,973 96,150 96,150 96,150 96,150 96,150	Mg VI Mg V Mg V Mg V Mg V Mg V Mg V Mg VI Mg V Mg VI Mg V Na VI Mg V Na VI Mg V Na VI Mg V Na VI Mg V Ng V Mg VI Na VI Mg VI	1 4 1 1 2 2 3 1 1 0 2 1 6 2 1 1 0 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1
99,333 99,290 99,279 99,203	Mg VI Al V Mg VI F VI	4 10 4 0	96,085 96,085 96,020	Mg VI Mg V Si VI	1 1 10
99,200 99,105 99,095 99,067	Al V F VI Si VI Mg V F VI	1 0 10 2 0	96, 019 95, 965 95, 933 95, 909	Mg V Mg V Na VI Mg V	2 1 3
99,044 99,025 99,025 99,004	Mg VI Mg V Na VI	2 2 0	95,835 95,803 95,803 95,720	Al V Mg VI Mg V Al	2 2 2 4

λ	Symbol	I	λ	Symbol	I
95,675 95,637 95,592 95,556 95,551 95,483	Mg VI Mg VI Mg V Mg V Na Mg VI	3 3 0 1 2 5	89,649 89,4 89,021 88,952 88,827 88,817	Mg VI Ne VII Mg VI Mg VI Mg VI Al V	0 3 0 2 2 1
95,436 95,421 95,385 95,319 95,263 95,182 94,970	AÏVI Mg VI Mg VI Na VI Na VI Na VI Al	2 4 4 0 1 1 3	88,688 88,688 88,636 88,539 88,539 88,469	Al VI Al VI Al VI Al VI Al VI Al VI	0 4 2 8 8 5
94,827 94,793 94,208 94,187 94,160 94,117	Na VI Mg V Na VI Al V Al V Al V	0 0 1 2 2 2,5	88,460 88,425 88,387 88,376 88,340	Na VI Al V Na VI Al VI Na VI Al VI	1 2 0 15 1
93,981 93,955 93,855 93,755 93,650 93,493	Al V Al V Al V Al V Mg Mg VI	2 6 4 7 2 3	88 ,273 88 ,270 88 ,246 88 ,223 88 ,170	Al VI Na VI Na VI Na VI Al VI	15 3 2 1
93,109 93,109 92,970 92,964 92,875 92,641	Mg VI Mg V Al VI Mg VI Al VI Mg V	1 1 5 1 10 0	88 ,143 88 ,1 88 ,038 88 ,016 87 ,887 87 ,866	Na VI Ne VIII Na VI Mg Al VI Al VI	2 9 1 2 5 7
92,636 92,626 92,588 92,428 92,409 91,836	Al VI Al VI Mg V Mg V Mg V Na VI	4 15 0 0 0	87 ,802 87 ,783 87 ,655 87 ,629 87 ,592	Al VI Al VI Al VI Al VI Al VI	5 5 13 2 10
91 ,798 91 ,750 91 ,737 91 ,475 91 ,414 91 ,369	Si VI Al V Na VI Na VI Na VI Si VI	4 1 0 0 0 4	87 ,544 87 ,524 87 ,406 87 ,334 87 ,279 87 ,211	Al VI Na Mg VI Al VI Al V Na VI	7 2 0 8 1 7
91,332 91,268 91,023 90,982 90,914 90,897 90,858	Al VI Na VI Al Al V Al V Mg VI Al VI	10 1 10 1 4 6 12	87,141 87,020 86,807 86,440 86,417 86,147	Na VI Al V Mg VI Mg Mg Al VI	1 2 2 2 2 4
90,852 90,746 90,701 90,646 90,630	Si V Na VI Al V Al V Al V	4 0 4 2 5	86,097 86,020 85,865 85,817 85,804 85,764	Al VI Al VI Al V Al VI Al V Al VI	3 2 7 7 8
90 ,468 90 ,453 90 ,200	Na VI Si V Al VI	$\begin{bmatrix} 3\\4\\20 \end{bmatrix}$	85 ,724 85 ,662	Al VI Al V	6 1

λ	Symbol	I	λ	Symbol	I
85,622 85,622 85,577 85,576 85,569	Al VI Mg VI Mg VI Si V Al VI	6 3 2 6 4	79,857 79,830 79,847 78,938	Mg VI Mg VI Mg VI Al	4 4 2 6
85,515 85,423 85,475 85,153	Al VI Al VI Si V Mg VI	20 2 10 0	78, 903 78, 614 78, 508 78, 459 78, 239	Si V Si V Al Al VI Mg VI	1 1 3 1,5
84,745 84,082 83,965 83,802 83,729	Mg VI Si VI Si VI Si VI Si VI	2 12 0 6 1	78,178 78,112 77,945 77,718	Al VI Al VI Al VI Si VI	$\begin{matrix} 1\\2\\10\\6\end{matrix}$
83,684 83,639 83,639 83,611	Si VI Si VI Na VI Si VI	1 3 1 8	77,511 77,429 77,405 76,953	Mg VI Si VI Mg VI Al VI Mg VI	1 10 2 1
83,560 83,526 83,519 83,403 83,358	Mg VI Si VI Mg VI Mg VI Si VI	2 8 3 4 8	76,908 76,853 76,794 76,697 76,618	Al Al Al VI Al VI	4 4 4 4
83 ,283 83 ,258 83 ,428 83 ,006	Si VI Si VI Si VI Si VI	1 5 15 4	75 ,890 75 ,834 75 ,666 75 ,587 75 ,486	Mg VI Mg VI Mg Si VI Si VI	0 2 3 1
82 ,853 82 ,475 82 ,3 82 ,267 82 ,238	Mg VI Mg VI Ne VII Al VI Mg VI	1 1 5 1 2	75, 334 75, 248 75, 193 74, 892	Mg VI Mg VI Si VI Al VI	1 1 4 2
82 ,082 81 ,738 81 ,584 81 ,543	Al VI Al VI Al VI Na VI Na VI	1,5 1 1 1	74 ,813 74 ,7 74 ,656 74 ,592	Al VI Ne VIII Al VI Al VI	1 4 5 3
81,498 81,113 81,106 81,030	Na VI Si V Mg VI Si VI	2 2 3 7	74 ,574 74 ,504 74 ,461 74 ,444	Mg VI Al VI Mg VI Al VI Al VI	2 1 0 6 1
80,930 80,908 80,821 80,807 80,770	Mg VI Si VI Si VI Si V Al VI	2 8 8 2 1,5	74,346 74,319 73,6 73,076 72,926	Mg VI Ne VIII Al VI Al VI	3 8 2 2
80 ,725 80 ,724 80 ,698 80 ,645	Si VI Mg VI Si VI Na VI S: VI	10 0 10 0 12	72,896 72,865 72,810 72,674	Si VI Al VI Al VI	1 1 5 6
80 ,577 80 ,501 80 ,491 80 ,449 80 ,395	Si VI Si VI Si VI Si VI Si VI	10 5 10 5	72 ,430 71 ,718 71 ,644 71 ,561	Mg VI Si VI Si VI Si VI	1 () () 1
80,345 80,075 80,032 79,880	Na VI Mg VI Mg VI Mg	0 2 2 2 2	71 ,534 71 ,474 71 ,384 71 ,366 71 ,340	Si VI Si VI Si VI Si VI Si VI	1 1 4 3 1
- ,	9				000

λ	Symbol	I	λ	Symbol	I
71,304 71,273 71,181 69,631 69,448	Si VI Si VI Si VI Al Si VI	0 2 5 4 2	40 ,270 34 ,973 33 ,734 33 ,426 32 ,754	C V C V C VI C V C V	
69,421 69,236 69,204 69,165 68,223	Si VI Si VI Si VI Al Al VI	1 5 1 4	32 ,400 32 ,188 32 ,064 29 ,084 28 ,787	C V C V C V N VI N VI	_ _ _ _
68 .167 67 ,3 66 ,796 66 ,772 65 ,9	Al VI Ne VIII Si VI Si VI Ne VIII	1 8 0 0 6	28 ,464 26 ,988 24 ,898 23 ,771 21 ,804	C VI C VI N VI N VI O VII	_ _ _ _
65,211 65,004 62,4 60,7 40,731	Si VI Si VI Ne VIII Ne VIII C V	0 0 3 3	21,602 18,627 17,768 17,396 17,200	O VII O VII O VII O VII	_ _ _ _

Section V Auxiliary Tables

FORBIDDEN LINES

λ, Å	I	E _H , eV	E _B , eV	Transition	J				
He I									
4920,35 4517,43 4469,92 4045,16 4025,49 4007,81 3829,47 3819,25 3704,79 3634,10 3587,16 601,404 591,412 540,935 538,896 537,33 523,724 516,359	- - - - - - - 5 20 - - -	21,22 20,96 20,96 20,96 20,96 20,96 20,96 20,96 20,96 0,00 0,00 0,00 0,00 0,00 0,00	23,74 23,71 23,74 24,03 24,04 24,31 24,20 24,21 24,31 24,37 24,42 20,61 20,96 22,92 23,01 23,07 23,67 24,01	$\begin{array}{c} 2p\ ^{1}P^{\circ}-4f\ ^{1}F^{\circ}\\ 2p\ ^{3}P^{\circ}-4p\ ^{3}P^{\circ}\\ 2p\ ^{3}P^{\circ}-4f\ ^{3}F^{\circ}\\ 2p\ ^{3}P^{\circ}-5p\ ^{3}P^{\circ}\\ 2p\ ^{3}P^{\circ}-5p\ ^{3}P^{\circ}\\ 2p\ ^{3}P^{\circ}-5f\ ^{3}F^{\circ}\\ 2p\ ^{1}P^{\circ}-7p\ ^{1}P^{\circ}\\ 2p\ ^{3}P^{\circ}-6p\ ^{3}P^{\circ}\\ 2p\ ^{3}P^{\circ}-6f\ ^{3}F^{\circ}\\ 2p\ ^{3}P^{\circ}-8f\ ^{3}F^{\circ}\\ 2p\ ^{3}P^{\circ}-8f\ ^{3}F^{\circ}\\ 2p\ ^{3}P^{\circ}-9f\ ^{3}F^{\circ}\\ 1s^{2}\ ^{1}S-2s\ ^{1}S\\ 1s^{2}\ ^{1}S-2s\ ^{1}S\\ 1s^{2}\ ^{1}S-3s\ ^{1}S\\ 1s^{2}\ ^{1}S-3s\ ^{1}S\\ 1s^{2}\ ^{1}S-3d\ ^{1}D\\ 1s^{2}\ ^{1}S-3d\ ^{1}D\\ 1s^{2}\ ^{1}S-4s\ ^{1}S\\ 1s^{2}\ ^{1}S-5s\ ^{1}S\end{array}$	1-3 2-2, 1, 0 2-4, 3, 2 2-2, 1, 0 2-4, 3, 2 1-1 2-2, 1, 0 2-4, 3, 2 2-4, 3, 2 2-4, 3, 2 2-4, 3, 2 0-0 0-1 0-0 0-1 0-2 0-0 0-0 0-1 0-2 0-0 0-0				
				Li I					
6240,4 4636,0 4148,4 3921,6 3195,6 2732,3 2557,4	2 1 - 3 2 -	1,85 1,85 1,85 1,85 0,00 0,00 0,00	3,83 4,52 4,84 5,01 3,88 4,54 4,85	$2p\ ^{2}P^{\circ}$ $3p\ ^{2}P^{\circ}$ $2p\ ^{2}P^{\circ}$ $4p\ ^{2}P^{\circ}$ $2p\ ^{2}P^{\circ}$ $5p\ ^{2}P^{\circ}$ $2p\ ^{2}P^{\circ}$ $6p\ ^{2}P^{\circ}$ $2s\ ^{2}S$ $3d\ ^{2}D$ $2s\ ^{2}S$ $4d\ ^{2}D$ $2s\ ^{2}S$ $5d\ ^{2}D$	$\begin{array}{c} 3/2, \ 1/2 - 3/2, \ 1/2 \\ 3/2, \ 1/2 - 3/2, \ 1/2 \\ 3/2, \ 1/2 - 3/2, \ 1/2 \\ 3/2, \ 1/2 - 3/2, \ 1/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ 1/2 - 3/2 \\ \end{array}$				
				CI					
9849,5 9823,4 9808,9 8727,4 4627,3 4621,5	_ _ _ _	0,005 0,002 0,00 1,26 0,005 0,002	1,26 1,26 1,26 2,68 2,68 2,68	$2p^{2} {}^{3}P - 2p^{2} {}^{1}D \ 2p^{2} {}^{3}P - 2p^{2} {}^{1}D \ 2p^{2} {}^{3}P - 2p^{2} {}^{1}D \ 2p^{2} {}^{3}P - 2p^{2} {}^{1}S \ $	$ \begin{array}{r} 2-2 \\ 1-2 \\ 0-2 \\ 2-0 \\ 2-0 \\ 1-0 \end{array} $				
				NI					
10404,1 10395,4 5200,41 5197,94 3466,4	 	2,38 2,38 0,00 0,00 0,00	3,57 3,57 2,38 2,38 3,57	$\begin{array}{c} 2p^{3} \ ^{2}D^{\circ}-2p^{3} \ ^{2}P^{\circ} \\ 2p^{3} \ ^{2}D^{\circ}-2p^{3} \ ^{2}P^{\circ} \\ 2p^{3} \ ^{4}S^{\circ}-2p^{3} \ ^{2}D^{\circ} \\ 2p^{3} \ ^{4}S^{\circ}-2p^{3} \ ^{2}D^{\circ} \\ 2p^{3} \ ^{4}S^{\circ}-2p^{3} \ ^{2}P^{\circ} \end{array}$	$\begin{array}{c} 5/2 - 3/2, & 1/2 \\ 3/2 - 3/2, & 1/2 \\ 3/2 - 5/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2, & 1/2 \end{array}$				
				N II					
6583,37 6548,06 6527,4 5754,57 3070,8 3063,0	 	0,02 0,01 0,00 1,90 0,02 0,01	1,90 1,90 1,90 4,05 4,05 4,05	$\begin{array}{c} 2p^2 \ ^3P - 2p^2 \ ^1D \\ 2p^2 \ ^3P - 2p^2 \ ^1D \\ 2p^2 \ ^3P - 2p^2 \ ^1D \\ 2p^2 \ ^1D - 2p^2 \ ^1S \\ 2p^2 \ ^3P - 2p^2 \ ^1S \\ 2p^2 \ ^3P - 2p^2 \ ^1S \end{array}$	$\begin{array}{c} 2-2 \\ 1-2 \\ 0-2 \\ 2-0 \\ 2-0 \\ 1-0 \end{array}$				
				0 I	4 0				
6363,82 6300,31 5577,350 2972,3	- - - -	0,02 0,00 1,97 0,02	1,97 1,97 4,19 4,19	$2p^4 ^3P - 2p^4 ^1D \ 2p^4 ^3P - 2p^4 ^1D \ 2p^4 ^1D - 2p^4 ^1S \ 2p^4 ^3P - 2p^4 ^1S$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \\ 1-0 \end{array} $				

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
			-	O II	
7330 ,19 7319 ,92 3728 ,80 3726 ,04	_ _ _ _	3,33 3,32 0,00 0,00	5,02 5,02 3,32 3,33	$2p^{3} {}^{2}D^{\circ} - 2p^{3} {}^{2}P^{\circ}$ $2p^{3} {}^{2}D^{\circ} - 2p^{3} {}^{2}P^{\circ}$ $2p^{3} {}^{4}S^{\circ} - 2p^{3} {}^{2}D^{\circ}$ $2p^{3} {}^{4}S^{\circ} - 2p^{3} {}^{2}D^{\circ}$	3/2 - 3/2, 1/2 $5/2 - 3/2, 1/2$ $3/2 - 5/2$ $3/2 - 3/2$
				O III	
5006 ,86 4958 ,93 4931 ,0 4363 ,19	_ _ _	0,04 0,01 0,00 2,50	2,51 2,51 2,51 5,35	$2p^2 \ ^3P - 2p^2 \ ^1D \ 2p^2 \ ^3P - 2p^2 \ ^1D \ 2p^2 \ ^3P - 2p^2 \ ^1D \ 2p^2 \ ^1D - 2p^2 \ ^1S$	$ \begin{array}{r} 2-2 \\ 1-2 \\ 0-2 \\ 2-0 \end{array} $
				F II	
4869 ,3 4789 ,5 4157 ,5	<u>-</u>	0,04 0,00 2,59	2,59 2,59 5,59	$2p^4 \ ^3P - 2p^4 \ ^1D$ $2p^4 \ ^3P - 2p^4 \ ^1D$ $2p^4 \ ^1D - 2p^4 \ ^1S$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \end{array} $
				F III	
5733,0 5721,2	_	4,23 4,23	6 ,39 6 ,39	$2p^{3} {}^{2}D^{\circ} - 2p^{3} {}^{2}P^{\circ} 2p^{3} {}^{2}D^{\circ} - 2p^{3} {}^{2}P^{\circ}$	$\frac{3}{2}$ $\frac{3}{2}$, $\frac{1}{2}$ $\frac{5}{2}$ $\frac{3}{2}$, $\frac{1}{2}$
1000 00		0.00	0.40	F IV	
4060,23 3997,40 3532,2	_ _ _	0,08 0,03 3,13	3,13 3,13 6,64	$2p^{2} {}^{3}P - 2p^{2} {}^{1}D$ $2p^{2} {}^{3}P - 2p^{2} {}^{1}D$ $2p^{2} {}^{1}D - 2p^{2} {}^{1}S$	2—2 1—2 2—0
				Ne I	
3899,723 3889,427 3887,134 3882,698 3769,654 3769,449 3768,047 3765,819	2 5 1 2 5 7 5 5	16,85 16,85 16,85 16,85 16,85 16,85 16,85 16,85	20,02 20,03 20,04 20,04 20,14 20,14 20,14 20,14	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1-1 1-3 1-2 1-2 1-2 1-3 1-2 1-1
				Ne III	
3967 ,47 3868 ,76 3342 ,9	_ 	0,08 0,00 3,20	3,20 3,20 6,91	$2p^4 {}^{3}P - 2p^4 {}^{1}D$ $2p^4 {}^{3}P - 2p^4 {}^{1}D$ $2p^4 {}^{1}D - 2p^4 {}^{1}S$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \end{array} $
				Na I	
5675,3 5669,8 4977,6 4973,4 4665,8 4662,0	3 1 1 —	2,10 2,10 2,10 2,10 2,10 2,10 2,10	4,29 4,29 4,59 4,59 4,76 4,76	$3p \ ^{2}P^{\circ}$ — $4f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}$ — $4f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}$ — $5f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}$ — $5f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}$ — $6f \ ^{2}F^{\circ}$ $3p \ ^{2}P^{\circ}$ — $6f \ ^{2}F^{\circ}$	$\begin{array}{c} 3/_2 - 5/_2, \ 7/_2 \\ 1/_2 - 5/_2, \ 7/_2 \\ 3/_2 - 5/_2, \ 7/_2 \\ 1/_2 - 5/_2, \ 7/_2 \\ 3/_2 - 5/_2, \ 7/_2 \\ 1/_2 - 5/_2, \ 7/_2 \end{array}$
				Na IV	
3445 ,9 3319 ,3	_	$\substack{0,14\\0,00}$	3,86 3,86	$2p^4 \ ^3P - 2p^4 \ ^1D \ 2p^4 \ ^3P - 2p^4 \ ^1D$	1—2 2—2
				Na V	
4021,6 4017,5 4015,3 4011,2	 	5,90 5,90 5,90 5,90	8,98 8,98 8,99 8,99	$2p^3 \ ^2D^{\circ} - 2p^3 \ ^2P^{\circ} \ 2p^3 \ ^2D^{\circ} - 2p^3 \ ^2P^{\circ} \ 2p^3 \ ^2D^{\circ} - 2p^3 \ ^2P^{\circ} \ 2p^3 \ ^2D^{\circ} - 2p^3 \ ^2P^{\circ}$	$ \frac{3}{2} - \frac{1}{2} $ $ \frac{5}{2} - \frac{1}{2} $ $ \frac{3}{2} - \frac{3}{2} $ $ \frac{5}{2} - \frac{3}{2} $

λ, Å	I	$E_{ m H}^{}$, eV	E _B , eV	Transition	J
				Si I	
10991 ,52 6589 ,74 6526 ,85	_ _ _	0,78 0,03 0,01	1 ,91 1 ,91 1 ,91	$\begin{array}{c} 3p^{2} {}^{1}D - 3p^{3} {}^{1}S \\ 3p^{2} {}^{3}P - 3p^{2} {}^{1}S \\ 3p^{2} {}^{3}P - 3p^{2} {}^{1}S \end{array}$	$egin{array}{c} 2-0 \ 2-0 \ 1-0 \ \end{array}$
				Cl II	
9125,8 8579,5 6152,9 3675,0 3583,2	- - - -	0,09 0,00 1,44 0,09 0,00	1,44 1,44 3,46 3,46 3,46	$3p^4 \ ^3P - 3p^4 \ ^1D$ $3p^4 \ ^3P - 3p^4 \ ^1D$ $3p^4 \ ^1D - 3p^4 \ ^1S$ $3p^4 \ ^3P - 3p^4 \ ^1S$ $3p^4 \ ^3P - 3p^4 \ ^1S$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \\ 1-0 \\ 2-0 \end{array} $
				Cl III	
8550,5 8501,8 8481,6 8433,7 5537,7 5517,2 3353,4 3342,7	- - - - - -	2,25 2,24 2,25 2,24 0,00 0,00 0,00 0,00	3,70 3,70 3,71 3,71 2,24 2,25 3,70 3,71	$3p^{3} {}^{2}D^{\circ} - 3p^{3} {}^{2}P^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}D^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}D^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}P^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}P^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}P^{\circ}$	$\begin{array}{c} 5/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \\ 3/2 - 1/2 \\ 3/2 - 3/2 \end{array}$
				Cl IV	
8046,1 7530,9 5322,2 3203,3 3118,3	_ _ _ _	0,17 0,06 1,71 0,17 0,06	1,71 1,71 4,04 4,04 4,04	$\begin{array}{c} 3p^2 \ ^3P - 3p^2 \ ^1D \\ 3p^2 \ ^3P - 3p^2 \ ^1D \\ 3p^2 \ ^3D - 3p^2 \ ^1S \\ 3p^2 \ ^3P - 3p^2 \ ^1S \\ 3p^2 \ ^3P - 3p^2 \ ^1S \end{array}$	$egin{array}{c} 2-2 \\ 1-2 \\ 2-0 \\ 2-0 \\ 1-0 \\ \end{array}$
				Ar I	
5533,20 5396,96 5353,46 5263,02 5147,34 5098,97 5081,19 5029,64 5007,09 5006,84 4976,87 4936,50 4929,16 4901,26 4859,44 4759,65 4748,23 4744,47 4615,15 4611,75	1 1 20 2 1 20 1 5 2 2 1 1 2 2 1 5 2 1 1 2 1 1 2 1 1 1 1	11,62 11,55 11,55 11,55 11,83 11,55 11,62 11,55 11,72 11,72 11,55 11,55 11,62 11,55 11,62 11,55	13,62 13,84 13,86 13,90 14,24 13,98 14,06 14,01 14,10 14,21 14,23 14,06 14,15 14,15 14,10 14,15 14,23 14,24 14,23 14,24	4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[2^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[2^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[2^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[2^{1}/_{2}]^{\circ}$ 4s' $[1^{1}/_{2}]^{\circ}$ —3d' $[2^{1}/_{2}]^{\circ}$ 4s' $[1^{1}/_{2}]^{\circ}$ —3d' $[2^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[2^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d $[1^{1}/_{2}]^{\circ}$ 4s $[1^{1}/_{2}]^{\circ}$ —3d' $[1^{1}/_{2}]^{\circ}$	1-1 2-0 2-1 2-2 1-3 2-4 1-2 2-3 1-3 1-1 0-2 0-2 2-2 1-1 2-3 2-1 1-2 1-3 2-2 2-3
				Ar III	
7751,06 7135,80 5191,82 3109,0 3005,1	 	0,14 0,00 1,74 0,14 0,00	1,74 1,74 4,12 4,12 4,12	$3p^4 \ ^3P - 3p^4 \ ^1D$ $3p^4 \ ^3P - 3p^4 \ ^1D$ $3p^4 \ ^3P - 3p^4 \ ^1S$ $3p^4 \ ^3P - 3p^4 \ ^1S$ $3p^4 \ ^3P - 3p^4 \ ^1S$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \\ 2-0 \\ 1-0 \end{array} $
				Ar IV	
7332,0 7262,76	- -	2,63 2,61	4,32 4,32	$3p^3 {}^{2}D^{\circ} - 3p^3 {}^{2}P^{\circ} \ 3p^3 {}^{2}D^{\circ} - 3p^3 {}^{2}P^{\circ}$	$\frac{5}{2} \frac{1}{2}$ $\frac{3}{2} \frac{1}{2}$

λ, Å	I	$E_{ m H}$, eV	E _B , eV	Transition	J
7237,26 7170,62 4740,20 4711,33	 	2,63 2,61 0,00 0,00	4,34 4,34 2,61 2,63	$3p^3 ^2D^{\circ} - 3p^3 ^2P^{\circ} \ 3p^3 ^2D^{\circ} - 3p^3 ^2P^{\circ} \ 3p^3 ^4S^{\circ} - 3p^3 ^2D^{\circ} \ 3p^3 ^4S^{\circ} - 3p^3 ^2D^{\circ}$	$ \begin{array}{c} 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array} $
7005,67 6435,10 4625,54	_ _ _	0,25 0,09 2,02	2,02 2,02 4,70	Ar V $\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 2-2 \\ 1-2 \\ 2-0 \end{array}$
4642,373 4641,876	11 10	0,00 0,00	2,67 2,67	K I 4s ² S-3d ² D 4s ² S-3d ² D	$^{1/2}_{1/2}$ $^{5/2}_{1/2}$
6794,8 6101,83 4510,9	_ 	0,21 0,00 2,03	2,03 2,03 4,78	K IV $\begin{array}{c} 3p^{4} {}^{3}P - 3p^{4} {}^{1}D \\ 3p^{4} {}^{3}P - 3p^{4} {}^{1}D \\ 3p^{4} {}^{4}D - 3p^{4} {}^{1}S \end{array}$	$ \begin{array}{c} 1-2 \\ 2-2 \\ 2-0 \end{array} $
6446,5 6349,5 6316,6 6223,4 4163,30 4122,63	- - - -	3,00 2,98 3,00 2,98 0,00 0,00	4,93 4,93 4,97 4,97 2,98 3,00	K V $3p^{3} {}^{2}D^{\circ} - 3p^{3} {}^{2}P^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}D^{\circ}$ $3p^{3} {}^{4}S^{\circ} - 3p^{3} {}^{2}D^{\circ}$	$\begin{array}{c} 5/2 - 1/2 \\ 3/2 - 1/2 \\ 5/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 3/2 \\ 3/2 - 5/2 \end{array}$
4916,18 4912,82 4575,46	_ _ _	0,00 0,00 0,00	2,52 2,52 2,71	Ca I $4s^{2} {}^{1}S - 3d {}^{3}D$ $4s^{2} {}^{1}S - 3d {}^{3}D$ $4s^{2} {}^{1}S - 3d {}^{1}D$	$0-1 \\ 0-2 \\ 0-2$
7323 ,88 7291 ,46	_	00,00 00,0	1,69 1,70	Ca II $ \begin{array}{c} 4s {}^{2}S - 3d {}^{2}D \\ 4s {}^{2}S - 3d {}^{2}D \end{array} $	$^{1}/_{2}$ $^{3}/_{2}$ $^{1}/_{2}$ $^{5}/_{2}$
6086 ,92 5309 ,18 3996 ,3	_ 	0,30 0,00 2,33	2,33 2,33 5,44	Ca V $\begin{array}{cccccccccccccccccccccccccccccccccccc$	$ \begin{array}{r} 1-2 \\ 2-2 \\ 2-0 \end{array} $
5775,56 5643,04 5608,37 5476,58 5337,72 5290,76 5232,06	2 1 3 2 1 1 2	10,03 9,91 9,91 9,91 10,03 9,91 9,91	12,18 12,11 12,12 12,18 12,35 12,26 12,28	Kr I $5s [1^{1}/_{2}]^{\circ}-4d [3^{1}/_{2}]^{\circ}$ $5s [1^{1}/_{2}]^{\circ}-4d [1^{1}/_{2}]^{\circ}$ $5s [1^{1}/_{2}]^{\circ}-4d [3^{1}/_{2}]^{\circ}$ $5s [1^{1}/_{2}]^{\circ}-4d [3^{1}/_{2}]^{\circ}$ $5s [4^{1}/_{2}]^{\circ}-4d [1^{1}/_{2}]^{\circ}$ $5s [4^{1}/_{2}]^{\circ}-4d [2^{1}/_{2}]^{\circ}$ $5s [4^{1}/_{2}]^{\circ}-4d [2^{1}/_{2}]^{\circ}$ $5s [4^{1}/_{2}]^{\circ}-4d [2^{1}/_{2}]^{\circ}$	1-3 2-2 2-4 2-3 1-1 2-2 2-3
9902,2 6826,9	_	$^{0,56}_{0,00}$	1 ,82 1 ,82	Kr III 4p ⁴ ³ P—4p ⁴ ¹ D 4p ⁴ ³ P—4p ⁴ ¹ D	$_{2-2}^{1-2}$
6949,76 6507,50 4576,60	1 3 2	8,44 8,31 8,31	10,22 10,22 11,10	Xe I $6s [1^{1}/_{2}]^{\circ}-5d [2^{1}/_{2}]^{\circ}$ $6s [1^{1}/_{2}]^{\circ}-5d [2^{1}/_{2}]^{\circ}$ $6s [1^{1}/_{2}]^{\circ}-6d [2^{1}/_{2}]^{\circ}$	$ \begin{array}{r} 1 - 3 \\ 2 - 3 \\ 2 - 3 \end{array} $

λ. λ	I	E_{H} , eV	E _B , eV	Transition	J
				Xe II	
9487,5 4061,06 3978,98 2631,25	4 3 2 2	0,00 12,92 15,02 11,27	1,31 15,98 18,14 15,98	$5p^{5} ^{2}P^{\circ} - 5p^{5} ^{2}P^{\circ}$ $6s ^{2}P^{\circ} - 6d ^{4}F^{\circ}$ $6p ^{2}S^{\circ} - 7s' ^{2}D$ $5p^{6} ^{2}S - 6p' ^{2}F^{\circ}$	$ \begin{array}{c} 3/2 - 1/2 \\ 1/2 - 5/2 \\ 1/2 - 5/2 \\ 1/2 - 5/2 \end{array} $
				Xe III	
10206,5 5846,3	1 6	00,00 00,0	1,21 2,12	$5p^4 \ ^3P - 5p^4 \ ^3P - 5p^4 \ ^1D$	2—1 2—2
				Cs I	
8053,35 7990,68 7270,70 7219,70 6895,005 6848,906	100 100 15 15 —	1,81 1,80 1,81 1,80 0,00	3,35 3,35 3,51 3,51 1,80 1,81	$5d\ ^2D - 5g\ ^2G$ $5d\ ^2D - 5g\ ^2G$ $5d\ ^2D - 6g\ ^2G$ $5d\ ^2D - 6g\ ^2G$ $5d\ ^2D - 6g\ ^2G$ $6s\ ^2S - 5d\ ^2D$ $6s\ ^2S - 5d\ ^2D$	$\begin{array}{c} 5/2 - 9/2, & 7/2 \\ 3/2 - 9/2, & 7/2 \\ 5/2 - 9/2, & 7/2 \\ 3/2 - 9/2, & 7/2 \\ 1/2 - 3/2 \\ 1/2 - 5/2 \end{array}$

A

EDGES OF STABLE BANDS OF SOME MOLECULES (C_2 , O_2 , N_2 , O_2^+ , N_2^+ , CN, CO, CO^+ , NO, NO^+ , CO_2 , CH, OH, OH^+ , NH, SiO, He_2)

	·				
λ, Å	I	Molecule	λ, Å	1	Molecule
10420 8911,6 8722,3 8541,8 7852,5 7753,2 7626,2 7593,7 7503,9 7386,6 7210,4 7083,2 6927,6 6867,2 6856,3 6804,0 6792,5 6788,6 6704,8 6623,6 6623,6 6623,6 6620,3 6544,8 6513,5 6478,7 6468,5 6464,6 6442,3 6418,7 6399,0 6398,7 6398,7 6398,7 6398,7 6394,7 6368,9 6332,2 6322,9 6252,8 6244,0 6238,7 6191,7 6191,2 6191,7 6191,2 6192,1 6105,2 6079,9 6069,7 6010,5 6004,9 5998,9 5992,6 5980,7 5998,9	10 10 86 36 710 75 55 42 88 82 68 79 97 10 90 10 90 10 90 10 90 90 10 90 90 90 90 90 90 90 90 90 90 90 90 90	$\begin{array}{c} N_2^2 {}^2_2$	5958,7 5906,0 5899,3 5861,0 5858,2 5854,4 5826,4 5804,3 5755,2 5749,1 5733,0 5730,2 5670,5 5631,9 5621,7 5610,2 5598,3 5585,5 5540,7 5515,6 5501,9 5473,3 5499,9 5478,5 5372,8 5364 5354,1 5372,8 5364 5351,3 5300,5 5307,2 5295,7 5239,3 5198,2 5165,2 5148,8 5129,3 5072,1 5072,1 5072,1 5072,1 5072,1 5073,7 5031,7 5031,7 5031,7 5031,7 5031,8 4935,8 4910,9 4882,6 4832,6	288698977698626996038624625333344555583400562585285822623002	$\begin{array}{l} {\rm CNCCCNO^2^2^2^2^2^2^2^2^2^2^2^2^2$

λ, Å	I	Molecule	λ, Å	I	Molecule
4823,5 4814,7 4806,7 4802,3 4737,1 4723,5 4711,2 4709,2 4697,6 4684,8 4683,4 4661,3 4651,8 4649,7 4606,1 4602,6 4599,7 4586,4 4574,0 4565,8 4574,0 4565,8 4539,4 4535,5 4514,8 4510,9 4502,2 4479,8 4416,7 4393,1 4382,5 4380,3 4372,0 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4365,2 4371,4 4368,8 4372,0 4371,4 4368,7 4291,8 4293,7 4291,8 4293,7 4291,8 4293,7 4291,8 4293,7 4291,8 4293,7 4291,8 4291,9 4200,7	8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 8 1 9 3 1 1 1 1 1 3 3 3 8 2 7 8 4 3 1 3 1 3 1 3 1 3 1 1 1 1 1 1 1 1 1 1	$\begin{array}{c} \text{CO}_{2\text{O}} \\ \text{CO}_{$	4171,2 4141,8 4137,6 4124,8 4123,6 4115,8 4113,6 4102,3 4095,4 4093 4082,4 4068,1 4059,4 4041,8 4027,8 4025,3 4020,6 4019,7 4017,7 3999,6 3998,4 3997,3 3984,6 3973,5 3957,0 3944,7 3943,0 3940,3 3940,3 3914,4 3912,3 3909,5 3889,0 3884,3 3871,4 3871,4 3868,3 3871,4 3871,4 3868,3 3871,4 3871,4 3871,4 3871,7 3724,9 3711,2 3710,5 3755,4 3711,2 3710,5 3762,7 3665,0 3672,7 3665,0 3672,7 3665,0 3672,7 3665,0 3672,7 3665,0 3672,7 3665,0 36672,7 3665,0 3672,7 3665,0 36672,7 36672,9,8 36723,8	556779490196836399999951972850937554309689460096080898989954913	$\begin{array}{c} N_2^2 \\ N_2^2 \\ CO \\ C$

-				1	1
λ, Å	I	Molecule	λ, Å	I	Molecule
3612,4 3607,3 3603,0 3603,0 3600,8 3592,9 3590,4 3587,6 3585,9 3584,2 3583,9 3582,1 3576,9 3572,4 3565 3562,2 3536,7 3511,7 3500,4 3494,2 3493,3 3428,1 3424,6 3421,2 3399,7 3398,1 3397,8 3381,3 3376,4 3371,3 3370 3369,6 3369,6 3348,0 3332 3308,0 3332,7 3253,4 3253,4 3253,4 3253,4 3253,5 3242,1 3253,5 3242,1 3253,6 3369,0 3379,9 3064,0 3063,6 3043,6	188536787766600018898738644955591000893527253679905914882653091032	+2 2+2 2N + 2N - 2N 2N + 2O + 2 2+2 2O + 2+ 2 2 2+2 2O 2N 2N C C C C C C C N N N O C N O C C C C C	3008,8 2987,5 2984,2 2977,4 2976,8 2970,0 2935,7 2925 2919,8 2903,9 2901,9 2897,2 2890,3 2885,2 2875 2859,5 2858,1 2839,7 2833,1 2823,7 2820,8 2811,3 2810,4 2802,6 2799,7 2785,8 2780,5 2777,9 2776,7 2763,3 2761,9 2760,6 2752,9 2750 2747,6 2722,3 2722,2 2711,3 2705,3 2680,0 2672,4 2672,2 2665,3 2660,5 2638,8 2632,7 2630 2620,5 2668,5 2638,8 2632,7 2630 2620,5 2667,2 22667,3 2595,7 2596,9 2595,7 2591,0 2595,7 2591,0 2597,7 2587,5 2587,1 2587,7 2587,5 2587,5 2587,7 2588,8	4929689291838026400951824957282796619693857785872638064050590855	NO+200 2+2 20+2 2+20 20 H00+20 2H00 0+0 2+20 20 H00 CO NON CO NO

λ, Å	I	Molecule	λ, Å	I	Molecule
2557,3 2553,3 2551,8 2550,7 2550,3 2545,5 2532,8 2530,2 2518 2510,9 2509,9 2509,8 2504,6 2491 2489,9 2488,3 2487,8 2486,8 2471,1 2465 2461,6 2459,0 2451,8 2448,0 2451,8 2448,0 2451,8 2440,6 2459,0 2451,8 2440,8 2445,8 2440,8 2447,8 2448,0 2436,3 2433,9 2427,8 2419,4 2413,8 2409,2 2392,6 2389,7 2388,8 2377,5 2370,2 2365,7 2364,5	1 76 58 78 78 78 9 26 46 10 45 10 10 10 10 10 10 10 10 7 7 8 8 6 6 7 10 10 10 10 10 10 10 10 10 10 10 10 10	$\begin{array}{c} {\rm NH} \\ {\rm O}_2\\ {\rm CO}\\ {\rm NO}_2\\ {\rm CO}_2\\ {\rm O}_2^{\frac{1}{2}}\\ {\rm NO}_2\\ {\rm CO}_2\\ {\rm O}_2^{\frac{1}{2}}\\ {\rm NO}_2\\ {\rm CO}_2\\ {\rm CO}_2\\ {\rm CO}_2\\ {\rm CO}_2\\ {\rm CO}_2\\ {\rm CO}_2\\ {\rm NO}_2\\ {\rm NO$	2352,5 2351,4 2344,3 2342,4 2332,8 2326,6 2325 2325,2 2317,7 2299,6 2298,9 2269,4 2268,6 2261,7 2260,8 2257,7 2255,9 2244,3 2236,3 2226,8 2221,5 2221,3 2215,4 2214,5 2196,8 2189,8 2173,0 2156 2143,9 2141,2 2137,8 2125,9 2141,2 2137,8 2125,9 2141,2 2137,8 2125,9 2113,1 2112,4 2089,9 2067,6 2046,3 2041,2 2025,8 2023,5 2006,0	6 6 5 4 3 10 9 2 10 6 4 5 3 9 2 1 5 2 9 2 3 10 10 9 3 6 4 6 9 9 9 8 10 10 10 10 10 10 10 10 10 10 10 10 10	CO+ N ₂ SiO SiO N ₂ NO C ₂ NO CO+ NO CO+ SiO CO NO NO CO

MOLECULAR SPECTRUM OF HYDROGEN (H₂)

λ, À	I	λ, Å	1	λ, Å	I
		<u> </u>			
8724,18	9	6040 424	4	6090,910	7
	$\frac{2}{3}$	6940,421			
8663,91	.) C	6875,272	3	6080,778	10
8546,27	6	6840,886	3 4	6078,900	3 5
8528,11	2	6806,438	3	$\begin{bmatrix} 6074,386 \\ 6069,994 \end{bmatrix}$	8
8520,37 8486,08	2	6794,083 6756,262	3	6067,720	7
8444,62	2	6696,755	3	6066,631	7
8443,57	2	6622,590	4	6063,285	8
8398,26	2 2 2 2 2 3	6572,044	3	6053,265	5
8381,16	2	6567,047	1	6052,369	6
8366,89	$\frac{2}{3}$	6561,736	1	6047,850	5 6 5
8349,52	10	6561,064	$\dot{2}$	6041,027	$\ddot{3}$
8330,42	7	6559,131	1	6031,900	10
8273,26		6554,036	4	6031,474	5
8240,75	3	6527,355	3	6023,751	10
8222,90	2	6517,695	3	6021,273	9
8164,64	8	6441,502	3 3 3	6018,291	10
8130,77	3	6437,822	3	6011,396	3
8054,55	2	6433,490	3	6002,816	9
7997,20	8 3 2 8 3 2 2 2 2 3	6429,314	3	5994,062	10
7970,14	2	6428,113	10	5990,530	4
7812,42	3	6399,475	10	5989,239	5
7789,78	4	6380,110	4	5982,561	6
7732,74	2	6372,209	5 6	5975,437	10
$7685,53 \\ 7661,46$	2	6362,483 6340,574	7	5974,139	4 3
7650,75	3	6332,486	5	5970,933 5970,310	5 5
7606,36	4 2 2 2 3 4	6329,814	5	5967,273	4
7603,43	$\overline{4}$	6327,063	10	5963,473	4
7597,06		6320,379	3	5959,806	6
7544,99	3 3 2 3	6303,485	5	5959,615	$\overset{\circ}{4}$
7541,95	2	6299,420	10	5949,895	10
7538,32	3	6285,388	10	5947,302	6
7524,64	9	6277,103	3	5941,977	3
7506,95	3	6274,841	3	5938,620	10
7459,45	4	6271,313	5	5936,027	4
7449,14	4	6270,536	3	5932,295	3
7396,07	2	6267,966	3	5931,368	10
7395,04 $7374,87$	3	6238,388	10	5924,830	9
7374,37	$\frac{3}{4}$	$\begin{array}{c} 6233,014 \\ 6230,256 \end{array}$	5 7	5920,799	4
7350,00	4	6224,809	10	5920,489 5918,078	5
7328,12	4	6201,178	8	5916,506	ე წ
7309,56	4 5	6199,387	10	5916,056	ე 5
7295,42	3	6197,113	5	5910,165	5 5 5 3 3 5
7288,94	3	6182,989	10	5909,395	3
7269,96	7	6176,234	3	5889,033	5
7254,02	3	6174,888	3	5888,167	10
7253,28	10	6174,089	6	5884,632	8
7244,11	3	6169,637	7	5883,942	6
7240,57	6	6167,736	4	5879,201	3
7231,06	4	6161,605	8 5	5878,496	10
7230,66	4	6155,628	5	5871,952	6
7210,22	$\frac{3}{9}$	6151,470	4	5869,262	4
7195,66 7184,04	6	6146,192	3	5864,462	4 5 8
7134,04 $7179,52$	3	6135,395 6135,145	10	5859,808	5
7176,32	5	6134,313	3 5	5849,317	8
7168,81	8	6127,242	5 6	5836,133	8
7112,65	3	6121,787	10	5835,829 5833,065	ა ,
7095,10	4	6098,218	9	5833,065 5832,773	3 4 5
7049,60	3	6095,956	10	5831,016	3 4
896	- •		10	, 5001,010	+1

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λ, Å	I	λ, Å	I	λ, Å	I
5822,763	10	5597,636	10	5319,162	3
5822,073	4	5591,420	4	5317,889	5
5819,279	3 3	5590,094	3	5309,036	5 5
5817,600	3	5579,591	3	5304,415	
5816,438	4	5578,712	3	5303,238	4
5814,943	6 10	5573,920 5564,506	6 ′ 4	5303,104 5296,089	9 3
5812,587 5811,498	4	5561,741	3	5291,595	9
5806,099	8	5555,102	3	5284,500	9
5791,912	4	5552,525	8	5283,285	3
´ 5788,262	4	5544,771	3	5273,023	3
5785,768	7	5543,496	7	5272,296	10
5785,208	3	5543,112	4	5270,412	4 10
5778,984 5775,050	4 9	5537,466 5537,288	10 3	5266,045 5264,684	3
5775,050 5774,580	3	5535,980	5	5261,182	7
5773,224	、 5	5534,054	$\ddot{3}$	5256,610	7
5766,284	3	5527,346	3	5239,012	4
5762,719	3	5523,965	3	5226,771	6
5760,392	6	5520,881	3	5222,854	3 6
5759,559	6	5518,472	8 3	5214,623 5199,707	4
5757,350 5755,687	5 5	5507,853 5506,341	3 4	5197,213	$\overset{4}{4}$
5741,835	5	5505,522	10	5196,375	8
5740,089	3	5499,581	9	5180,583	7
5736,879	10	5495,964	8	5174,702	6
5735,130	6	5481,083	10	5168,235	4 6
5731,925	8	5474,856	$\frac{5}{3}$	5153,870 5146,340	5 5
5728,552	10 3	5471,577 5465,192	3 4	5143,567	$\frac{5}{3}$
$5727,052 \\ 5723,454$	6	5462,990	$\overset{1}{4}$	5122,583	4
5716,005	$\ddot{3}$	5459,598	8	5113,126	7
5713,449	3 5	5456,983	6	5109,307	$\frac{4}{3}$
5709,772	5	5455,316	4	5107,644	ა 4
5703,760	4 5	5438,777 5434,822	3 10	5103,566 5084,842	9
$5703,252 \\ 5700,644$	3 4	5430,871	3	5080,494	7
5696,175	3	5425,887	8	5075,442	4
5694,140	5	5425,200	4	5068,121	7
5692,465	3	∥ 5419,893	10	5067,475	$\frac{5}{6}$
5691,155	3	5417,797	$\frac{6}{2}$	5063,878	4
5689,195	10	5410,219 5409,692	3 4	5061,732 5055,091	9
5684,126 $5683,744$	5 3	5408,789	6	5048,004	9 5
5683,080	4	5405,328	5	5041,627	8
5682,507	3	5404,746	3	5039,821	9 9
5670,930	4	5401,053	8	5030,367	9 4
5662,872	3	5398,970	4	5020,744 5017,127	5
5661,626	3	5392,285	$\frac{6}{3}$	5016,496	5 6
5655,750	9	5391,144 5388,166	10	5015,069	8
5652,175 5642,942	3 5	5386, 195	3	5014,473	4
5642,717	3	5385,508	5	5013,036	10
5634,807	8	5378,391	5 3	5011,189	8 8
5634,161	3	5372,445	3	5007,988 5003,398	9
5630,620	4	5371,896 5365,902	4 7	4997,937	9 5
5627,435	3 4	5355,902	7	4996,852	3
5624,306 5623,081	4	5344,792	4	4990,147	4
5620,907	5	5343,166	4	4980,479	6
5612,541	10	5340,820	4	4978,256	4
5604,685	3	5336,581	$\frac{5}{6}$	4976,630 4973,310	3 8 5
5601,704	$\frac{3}{7}$	5334,264 5326,775	6 4	4969,222	$\bar{5}$
5600,416	7	µ 5540,115	7	, 2307 , 2222	897
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λ, Å	I	λ, Å	I	λ, Å	I
4966,909 4956,792 4955,763 4952,585 4949,536 4942,546 4939,603 4939,162 4935,242 4934,241 4933,515 4932,263 4928,795 4928,365 4925,233 4924,018 4919,127 4908,782 4908,063 4906,336 4891,269 4878,128 4875,964 4874,289 4873,010 4869,451 4867,029 4866,311 4863,643 4861,738 4860,806 4860,108 4858,754 4856,553 4849,303 4842,385 4838,242 4832,792 4831,563 4849,303 4842,385 4838,242 4832,792 4831,563 4824,568 4822,943 4817,514 4813,601 4801,993 4797,050 4793,913 4789,418 4780,957 4777,454 4770,610 4763,844 4756,948 4743,383 4742,780 4742,109 4740,985 4724,820 4723,032 4721,542 4719,043 4711,067 4709,536	6 5 6 3 3 3 4 5 3 0 4 3 3 5 5 5 3 4 4 3 6 4 8 4 3 1 1 3 0 2 3 9 9 3 6 5 5 6 3 7 2 4 0 3 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 6 3 1 3 1	4705,260 4702,562 4692,040 4690,184 4686,772 4686,142 4684,654 4683,824 4682,341 4680,432 4679,092 4675,312 4674,958 4674,530 4673,097 4671,305 4667,791 4667,083 4667,791 4667,083 4665,585 4662,811 4661,402 4663,395 4654,056 4652,999 4645,344 4634,032 4631,849 4631,986 4631,999 4588,678 4597,206 4588,678 4599,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994 4579,994	3557634865543437434368853636360980355550344343568803344445403535550344343435040568803344445403535	4543,692 4539,162 4537,731 4534,627 4534,157 4533,128 4533,087 4531,193 4529,079 4527,183 4524,139 4521,447 4519,959 4519,122 4517,428 4515,562 4514,313 4513,828 4511,690 4510,904 4505,631 4501,960 4498,523 4497,577 4497,101 4493,688 4497,577 4497,101 4473,688 4497,577 4477,071 4474,261 4477,071 4474,261 4477,071 4474,966 4458,732 4457,145 4460,965 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,665 4458,732 4457,030 4456,851 4460,965 4458,732 4457,030 4456,665 4458,732 4457,553 4447,932 4447,934 4414,994 4414,994 4414,994 4417,940 4417,940 4417,940 4417,940 4417,940 4417,940 4417,940 4417,940	554674535373333333333333333345664033594835638033344333566973333445344833

λ, Α	1	λ, Å	I	λ, Ά	I
4354,540 4343,600 - 4341,794 4339,817 4339,534 4337,380 4336,309 4335,519 4332,619 4327,927 4306,276 4303,877 4303,423 4289,641 4253,289 4233,818 4233,407 4224,503 4222,518 4222,158 4212,498 4210,131 4209,169 4205,098 4200,971 4199,793 4198,210 4195,674 4182,170 4180,111 4179,598 4177,720 4177,125 4175,165 4171,308 4165,195 4163,605 4161,941 4159,302 4156,861 4156,623 4133,995 4106,231	3 1 0 1 1 3 1 0 1 1 3 3 3 3 4 3 3 3 4 4 5 5 5 5 5 5 5 6 8 5 6 8 5 4 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7	4097, 433 4095, 533 4087, 755 4085, 243 4082, 383 4078, 843 4074, 100 4072, 961 4071, 235 4069, 631 4066, 877 4065, 617 4063, 631 4062, 457 4059, 254 4048, 451 4043, 567 4035, 567 4031, 757 4028, 333 4027, 377 4026, 605 4024, 734 4018, 899 4005, 943 4005, 943 4005, 943 4005, 943 4005, 943 4006, 840 3998, 254 3993, 848 3993, 255 3991, 145 3987, 363 3985, 702 3982, 633 3976, 835 3974, 772 3963, 144 3962, 328 3974, 772 3924, 409 3902, 620 3890, 700	3393574340934834543833433433433434631	3888,988 3887,836 3887,388 3886,218 3884,144 3879,526 3872,354 3871,594 3869,931 3863,202 3861,496 3860,711 3859,877 3851,266 3837,609 3836,443 3835,860 3835,381 3833,489 3832,415 3831,101 3824,940 3812,744 3803,031 3799,032 3798,816 3797,908 3797,518 3797,128 3796,595 3796,062 3791,403 3771,500 3751,879 3732,108 3771,500 3751,879 3732,108 3771,500 3751,879 3732,108 3772,093 3771,500 3751,879 3732,108 3722,093 3702,112 3684,313 3681,963 3674,398 3673,621 3665,907 3664,132 3652,460	3 2 1 1 3 2 1 1 3 4 4 4 5 3 4 4 4 4 3 3 0 2 0 1 0 0 1 2 2 5 2 5 2 6 1 2 2 2 3 3 2 2 2 3 3 2 2 2 3 3 3 2 2 2 3 3 3 2 2 2 3 3 3 3 2
4101,768 4101,690	_	3889,299	1	3394,838	